MODEL AIRPLANE NEWS

JANUARY 1958—35 CENTS

Lockheed Lightning

IN THIS ISSUE

Comper Swift—.049 Flier

1957 Nats Mulvihill Winner

German WW 1 Gotha—by Nye

All About the Pulse Jets

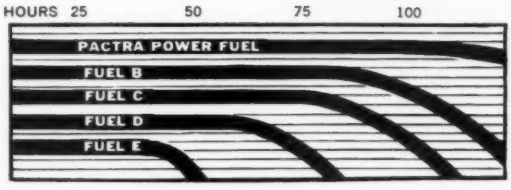
says BOB PALMER*

"I keep my contest engines running longer at FULL POWER with

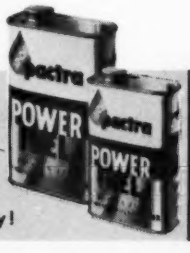
Champions, like Bob Palmer, are aware that most fuels leave residues that accumulate on engine parts, soon causing power fall-off. So they have always had "pet" engines used ONLY for contest flights, in order to baby them and retain their peak performance as long as possible.

But this is *no longer necessary*... because the special new lubricant—LUBEX 27—in Pactra POWER FUEL leaves a *minimum* of residue—easily expelled from the exhaust. And POWER FUEL runs cooler, too, giving *maximum* protection against overheating, seizing and scoring—so destructive to engines. Its balanced formula provides consistently smooth running throughout the entire flight, switching easily and smoothly from 2-cycle to 4-cycle operation... so very important for successful stunt maneuvers. The broader range of POWER FUEL eliminates need for critical needle valve adjustment in order to bring engines to flying speed... thus getting the plane in the air faster which, combined with the FULL power it gives, means *longer flights* per tankful... more economy.

Whether you're using your engine for contest flying or just plain fun—Pactra POWER FUEL—with Lubex 27—will keep it running cleaner longer at FULL POWER. See the chart at the right.



* *Winner Nationals OPEN STUNT Championship and 7 times California OPEN STUNT champion. One of Bob's favorite planes is this "Veco" Thunderbird, powered by a Veco .35 Engine.*



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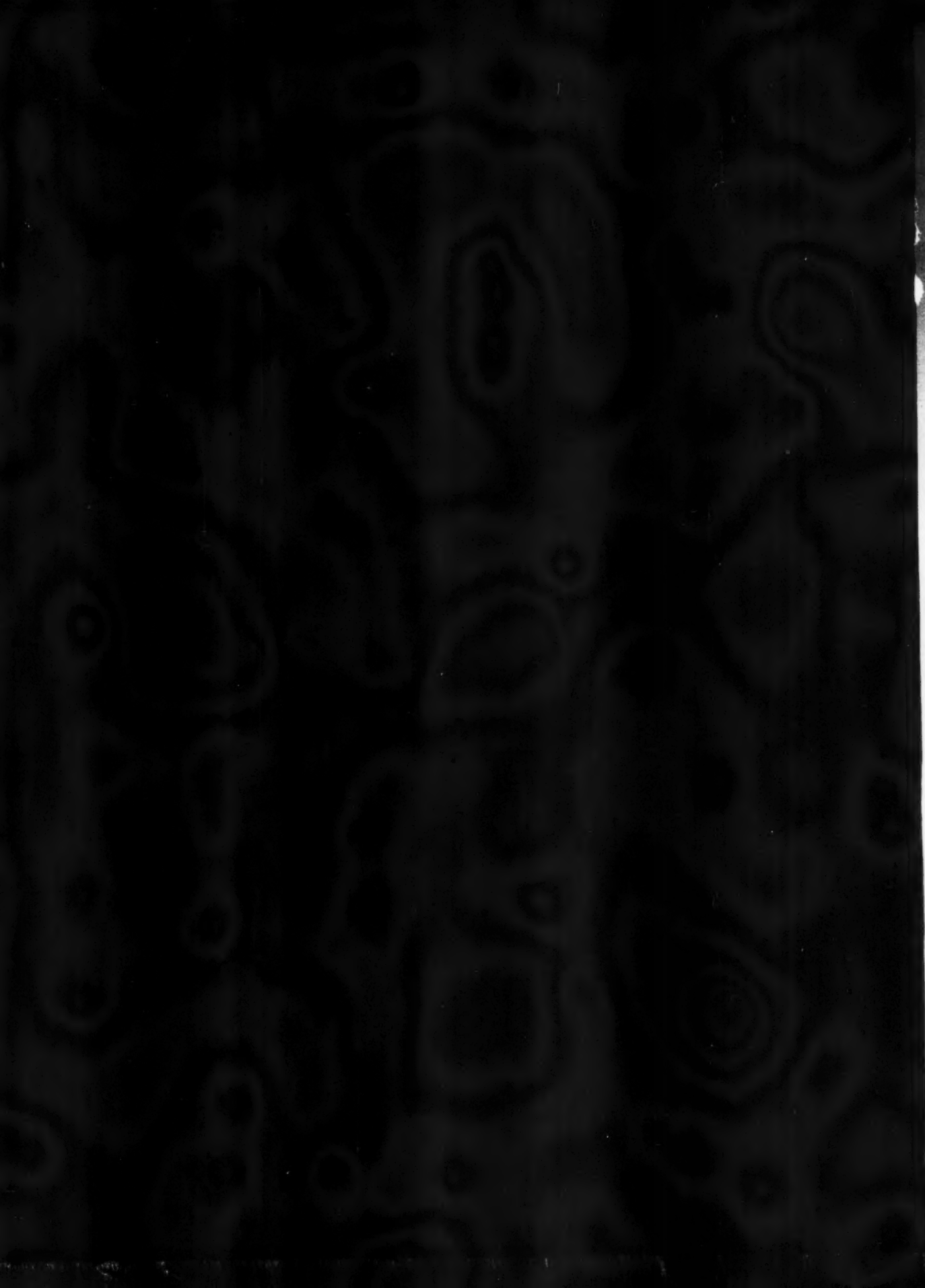

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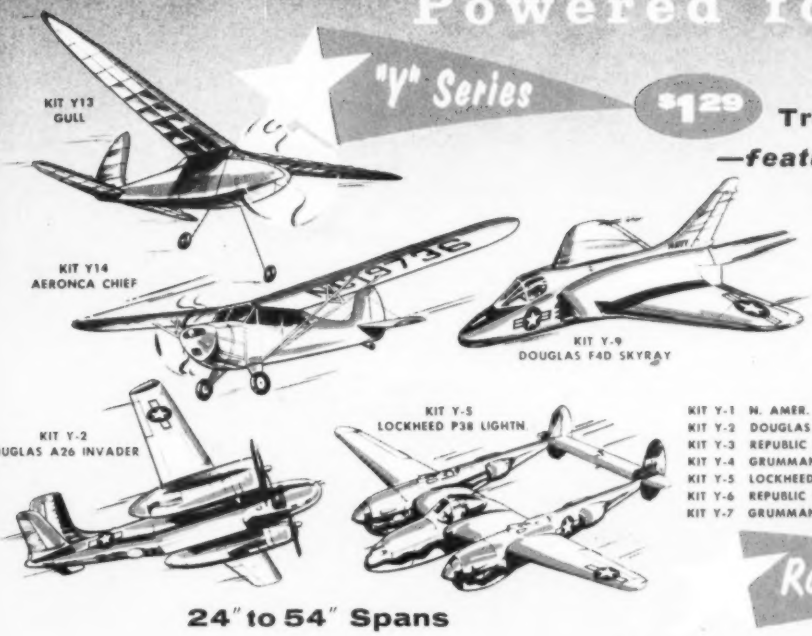

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True-to-Scale Balsa Flyers

—featuring 2 Great New Models

When it comes to flyability—Comet's "Y" 's have it! Giant wingspans—24" all the way to 54"; rubber-powered, but adaptable for ½A or "Jetex" engines. Jets, fighters, sports planes—including two new beauties—the Gull and Aeronca Chief. Colorful new boxes—terrific performers—and unbeatable values at only $1.29 each!

14 Marvelous Models

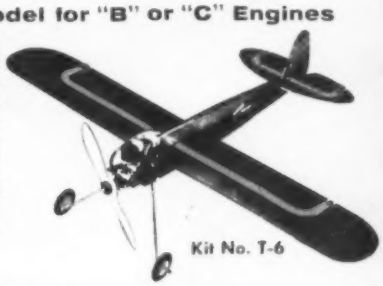
KIT Y-1 N. AMER. F51 MUSTANG	KIT Y-8 TAYLORCRAFT 54" W'GSP'N.
KIT Y-2 DOUGLAS A26 INVADER	KIT Y-9 DOUGLAS F4D SKYRAY
KIT Y-3 REPUBLIC P47 THUNDERBOLT	KIT Y-10 PIPER CUB 40" W'GSP'N.
KIT Y-4 GRUMMAN F6F HELLCAT	KIT Y-11 DOUGLAS D558-1 SKYSTREAK
KIT Y-5 LOCKHEED P38 LIGHTN.	KIT Y-12 N. AMER. F86D SABRE JET
KIT Y-6 REPUBLIC F84F THUNDERSTR'K.	KIT Y-13 GULL
KIT Y-7 GRUMMAN F9F-6 COUGAR	KIT Y-14 AERONCA CHIEF

24" to 54" Spans

Rookie Trainer — $3.50

U-Control Balsa Model for "B" or "C" Engines

So simple, so skillfully designed, anyone can build it—and brother, how it flies! SHAPED fuselage parts, wing, stabilizer and rudder; motor mount shaped and drilled; landing gear, wheels, etc., included. Takes Class "B" or "C" engines; Class III, IV and V. Wingspan 35½".

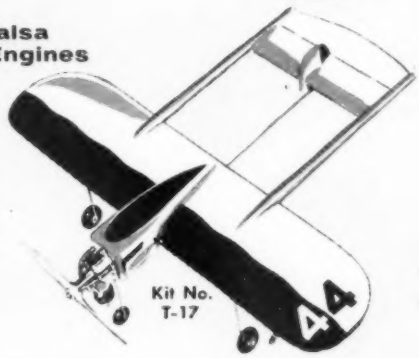


Kit No. T-6

"Little Schmoe" — $1.50

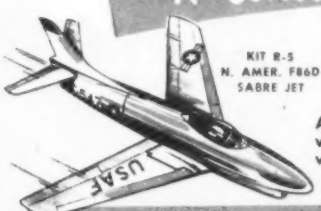
U-Control Balsa Model for ½A Engines

Puts on a thrilling show in the air—and amazingly easy to build—all parts are prefabricated, die-cut and completely finished! New wide landing gear and nose gear mean safer landings. Beginners love its ease of assembly—experts rave about its performance! Wingspan 17".



Kit No. T-17

"R" Series — 59c



KIT R-5
N. AMER. F86D
SABRE JET

11 Flying Scale Balsa Models

Authentic design, big wingspans; includes wanted jets and fighters.

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INTERNATIONAL COMPETITION NEWS

Bill Dean, had largest FAI at elims. Span 62".

► The 1958 U.S.A. International FAI Teams for Wakefield and Power have been selected by elimination and are:

WAKEFIELD

Sal Cannizzo, Staten Island, N.Y.	900	seconds
*George Reich, Fairview Park. O.	852	seconds
*Herb Kothe, Arlington, Tex.	837	seconds
Frank Newquist, Santa Monica, Cal.	818	seconds

POWER

*James Patterson, Granada Hills, Cal.	900	seconds
*Larry Conover, Cedar Rapids, Ia.	882	seconds
*Bill Dean, Winchester, Mass.	878	seconds
*Carl Perkins, Mission, Kan.	807	seconds

(*Team members in previous years)

These gentlemen deserve a lot of praise for a terrific job, and the times prove that we have a good team, well balanced with seasoned veterans, and former team members.

The heading photo is Bill Dean, 1958 Power Team member from Mass. Bill won his team place at the East Coast semi-finals at Solberg Airport, N.J. His model was the largest of the entries. Specifications are as follows:

Wing Span 62", area 490", NACA 6409 airfoil, CG 66% of chord, stab area 183", total lifting surfaces 673 sq. in., projected.; Body—Length 40½", nose moment 10" to C. G., total weight 872 grams, or 31 ounces; Power—Oliver Tiger, factory modified, prop 9/4 nylon tornado.

The change in picking the teams worked out well as far as weather went. The local elims weather was borderline, but it was superb for the semi-finals. One team member in each category turned in perfect scores, (Patterson and Cannizzo). An interesting sidelight, Cannizzo was prevailed upon by old pro Woody Blanchard to take a 6th flight for a record attempt. Cannizzo had only one ship left, but the weather was so calm he decided to try it. Launching with about a foot of fuse he remained aloft for 28 minutes, landing just off the field. The solid gray high overcast made for good visibility. Sure was a climax for such a fitting occasion. The high performance of the new-rule models in the semi-final flying just about eliminated the griping about the toughness of the rules.

Ed Dolby
International Competition Committee.

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29th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

JANUARY 1958 Vol. LVIII, No. 1

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FEATURES

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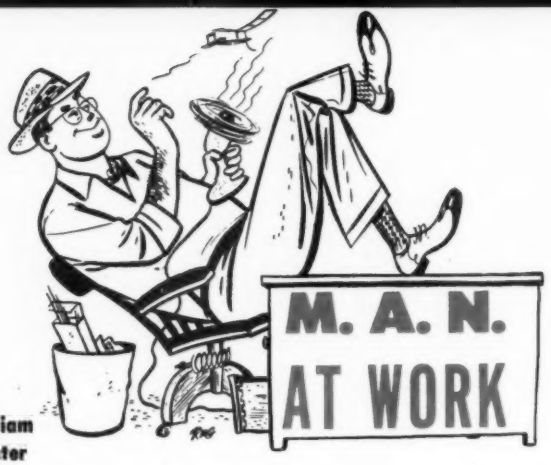

by William Winter

► This column is a staunch supporter of the Academy of Model Aeronautics. But the time has come, as the typewriter repair man taps out, for all good men to come to the aid of the party. The party, in this case, is a minority party who are opposed to tampering with the great, basic events at the Nationals, in order to accommodate a never ending addition of special events which, by their support to date, cannot be termed, even by the most enthusiastic, as anything but novelty events. Too many clever events that pull a dozen or two entrants, who fly, have become the tail that wags the dog.

Among the clubs which have protested to AMA that B and C free-flight should not be combined at the Nats, as was done this last year, are the Hamilton Aero Club, and the Lakewood Flitemasters, of Ohio; and the Long Beach Thunderbugs, Calif. At the Open Contest Board Meeting, during the Nats, a resolution was passed, to be submitted to the AMA. Moved by Leon Shulman, and seconded by Rudy Kluiber, it reads:

"Resolved that, in the future, B and C Class FF shall not be combined at the Nationals without the approval of the Contest Board. Also, that no other present events shall be combined without approval of the Contest Board.

"The arbitrary combination of two popular and well tried events in order to make room for events which had no assured entry list is a high-handed procedure which shows how little real control the Contest Board and the members in general have over the executive officers," states Mike Cook, secretary of the Hamilton Aero Club.

"The number of events at the Nationals has grown steadily," continues Cook. "The number of officals had to be correspondingly increased. The question of what to drop, or what to combine, is immediate.

"In 1956 there were roughly 15 entries in helicopter, 180 in B free flight, 130 in C free flight. What was dropped? Helicopter? C free flight! Not only that but rocket-powered FF, RC pylon, and RC scale were added.

"At the 1957 Nationals there were so few entries and flights in RC scale that only two places were recorded," cooks Cook. "The officials at RC scale could have been timing C class FF which would certainly have drawn 200 or more entries in a meet as big as the '57 Nats.

"It is up to all modelers to get behind the (*Continued on page* 55)

NEXT MONTH'S COVER
Loening OA-1A

PLANE ON THE COVER

One of the more unusual, but successful fighters of World War 2, was the Lockheed Lightning P-38. It fought in all theatres and, in North Africa, was dubbed by the Germans "the forked-tail devil." Two Allison engines of about 1,500 hp, speed above 429 mph. Span was 52 ft. Various "mods" up to the P-38J, and F-5. The "Connie" had scaled-up P-38 wing!

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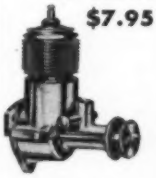

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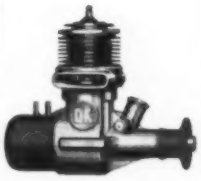

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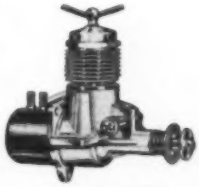

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.049 **$6.95**
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No. Amer. AT6 (SNJ) 31" A-B-C	4.95
No. Amer. AT6 18" AA	1.95
N.A. AT6 15¾" .049 to .074	1.29
N.A. Savage 26" .049 to .099	7.95
Northrup "Gamma" 16" .020 - .049	1.50
Omega 33" .15 to .35	2.95
P38 Lightning 41" .14 to .29	8.95
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Piper Tripacer 18" .049 to .074	1.95
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Blazer ½A 40" .049	2.50
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Cloud-Copter D2 26" AA	2.95
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Bonus items include: Tube of "REV-UP" Lubricant (makes your engine last twice as long), Ownership Decal, Correct Size Propeller, Glo Engine Handbook, Mounting Nuts & Bolts, Numeral & Alphabet Decals, etc., etc. FREE of extra cost.

FREE of extra charge with **GAS PLANES** selling at $1.95 or over

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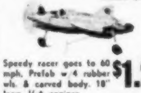

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Waco Cabin 35" .035 to .074	3.95
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ACCESSORIES

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Tornado Nylon: 5½ or 6", 3-4p	.25
9" or 10", 4-6 p	.85
Tornado: 10" D 3-5-6p	.30
5", 6" or 7" D 3-4-5-6-8 P	.20
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Kaysun plastic 5/3, 5½/2½, 5½/4, 6/3, 6/4, 6/5, - .15c; 7/3, 7/4, 7/5	.20
Top-Flite—6" in 3,4,5p—20c; 7" in 3,4,6p; 8" in 3½,5,6,8p; 9" in 4,5,6,7,8p; 10" in 3½,5,6,8,12p—25c; 11" in 4,6,8,10,12p; 12" in 5,8p; 13" 5½p, each .30 ... AND ALL OTHERS!	
Top Flite 5¼" or 6" 3 or 4 p	.15
Tornado 3 Blade (R or LH) 6", 3p	.20

METAL GAS TANKS

Darwin Brass Pee-Wee (⅞" w, ½" h): 1", 1½", 2", 2½" ea.	.50
L (2⅛" w, 1⅜" h): 1½", 2", 2½", 3" 3½", 4" ea.	1.00
Froom: #20 (1" w, ⅝" h): 1¼", 1½", 1¾", 2⅝" ea.	.65
#21 (2" w, 1" h): 2½", 3", 3½", 4" ea.	1.10
Perfect: 1½ x 1 x 2 (or 3")	.57
1⅝" x 1¼" x 3" (or 4")	.69

GLO PLUGS (STATE ENGINE)

McCoy, O&R, K&B, Kwik Start, Veco Cox, Fury, Wasp or T.D. ea.	.65
O.K. (short or long)	.59
Champion Spark	.50

WHEELS

K&B Alum. Hub: 1" — 40c; 1½" 60c 2" — 80c; 2½"	1.00
Semi Pneumatic (pr) 2" 2½"—1.40; 3"—1.75	1.25
Fuel Pump (pt. or ½ pt.)	.65
Pylon Fuel Pump 2 oz. 89; 4 oz.	.79
Black Neoprene Tubing, per foot	.30
Transparent Tube, (reg. or AA) ft.	.18
E-Z Running Stand, - 1.25; Lg.	1.75
Berkeley (½A) Test Stand	.39
Presto Disc Starter	.25
Pylon Engine Starter	1.95
Fuel-off Timer	1.95
Kading Stop-it 1.25; Timit	2.95
D.E. Shutoff Valve	1.25
Flexible Needle Valves: Cub, Royal Spitfire, Spitzy—49c; Wasp; Baby Spit, Infant, 39c; Universal Needle Valve (A-B-C engines) 50c; Flexible	.75
Needle Valve Extension flexible	.25
Plug Wrench .30; 4 Way Socket	.65
Glue Gun .50 — Plane Kleener	.50
Bolts ½", ¾", 1", 1¼", 1½", 2" 12/	.20
A.M.A. Decals ⅜" .10; 1" or 2"	.25
Scoremarker Decals (100)	.15
Austin Booster Plug-in	.25

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Boeing B17G, 19" (Lindberg)	2.49
Douglas DC3, 12" (Monogram)	.98
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PBY Catalina 17" (Aurora)	1.98
Stratofort B52, 13" (Revell)	.98
Stratotanker 13" (Comet)	.98
Stuka 11½" (Lindberg)	.98
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BOATS

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Btlshp. Missouri 20" (Revell)	1.98
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Constitution 19" (Revell)	2.98
FDR Carrier 22" (Revell)	2.49
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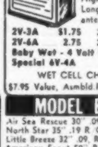
Nantucket 17" (Pyro)	6.95
Wasp 20" (Lindberg)	1.98
Fishing Schooner 20" (Pyro)	3.49

SPECIAL



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Baby Wet - 4 Volt 1.5A			1.45
Special 6V-4A			4.75

WET CELL CHARGER
$7.95 Value, Asmbld Rdy-to-Use—$5.95

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Air Sea Rescue 30" .099 or elec.	12.95
North Star 35" .19 R/C or elec.	16.95
Little Breeze 32" .09, R/C, elec.	19.95
American Scout 50" R/C	16.95
U.S.S. Missouri 56" R/C	18.95
Lark Speedboat 20" Outbd.	2.50
Tug Boat (Veco) 35" R/C	24.95
Corvette (Sterling) 48" R/C	26.95
Cobra 31½" A-D	9.95
Allyncraft 18" Plast. In or Outbd.	4.95
Flash (Plastic) 17" In or Outbd.	2.98
Cobra (Dumas) 27"	8.25
Chris-Craft Challenger 33" C-D	11.95
C.C. Catalina 31¼" .19 to .35	12.95
C.C. Custom Runabout 32" R/C	16.95
Hinckley 36" R/C	16.95
C.C. Motor Yacht 40" .19-.29	20.95
Sea Dart 16" (Outboard)	3.95
Sterling C.C. Bucc 19" AA-A	7.95
Sport Fisherman 35"	14.95
C.C. Cruiser 28" Radio Con. A-B	9.95

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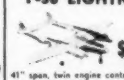
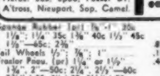
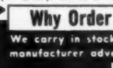


COX "PEE WEE" .020 $3.95 — New .020 Eng. flies most ½A planes. Only 1½" high. Develops max. pwr. at 18,000 RPM.



Guillow Flying SCALE MODELS — 18" spans. Rubber Pwr. WW I Heros: SE5, Spad, Fokker D7, A'tross, Nieuport, Sop. Camel. **1.29 ea.**



"P-38 LIGHTNING" NEW BERKELEY SENSATION **$8.95** — 41" span, twin engine controline model (.14 to .29). Carved & Hollow Fuslgs.

Sponge Rubber (pr) ⅞"-1" 30c 1⅛"; 1¼" 35c 1⅜" 40c 1½" 45c 1⅝"—65c; 2⅜"	.85
Tail Wheels ½"; ⅝"; 1"	.15
Traxler Pneu. (pr) 1¼" or 1½"	.40
1¾", 2"—50c; 2¼", 2½"—60c 2¾" 1.00; 3" 1.25; 3½" 1.50	
Pneu. Veco 3½" - 4.95 4½"	5.45
Wheel Collars (Retainers) pr.	.20

U-C ACCESSORIES

BERKELEY control lines	
.008, .010, .012 - 2'-55'	.50
.008, .010, .012, .014 2-70	.65
Stranded .015, .021 55' 1.00; 70' 1.25; 200'	3.50
PYLON control lines	
.008, .010, .012, .014, .016; 2-52'	.60
.010, .012, .014, .016 2-70'	.75
Stranded .015 - 018 x 2/52' —	1.75
Stranded .015 - 018 x 2/70' —	2.25
Nylon Lines AA	.25
U-Reely Contr. Handle w/wire	7.75
Cable .015 8.75 .018	8.95
Darwin Metal Control Handle	1.25
Berkeley Metal Flight Reel	1.25
Controliner Flight Reel (with handle & wire) ½A 2.25 A-B	2.50
Plastic Handle 4" or 5"	.95
T. D. Handy Reel & Handle ½A	1.50
Merco U-C Handle	.59
T. D. Deluxe Reel & Handle	2.95
Adjustable Push Rod Set	.25
Stiff Lead-Out .014, .020, .032 3'	.05
Elevator control horn .10, .25 &	.30
Elevator hinges: Cloth .10; Nylon	.15
Metal (4) .10; Perfect	.25
Pylon Bellcrank 2"—.20; 3"	.25
Veco Bellcrank 2"—.25; 3"	.30
Swivels, small 15c pr.; large	.20
Conn. Clips A, B, C or D 2 for	.15
Merco 1" Spinners (specify eng.)	.25
Spin'rs, Reg. or Needlenose 1¼"	.29
1½, 1¾, 2, 2¼" ea.	.39
Brass Tubing 1/16", 3/32", ⅛"	.20
Sandpaper Packs .10 &	.20
Pilot Heads .05, .10 &	.75
Plywood 6" x 12" x 1/16" .25; ⅛"	.30
Finger Guard .25 — Vibratec	5.00
Midget Switch: slide—.25 Toggle	.80
Condenser .20; Smith Metal	.35
Rogers or Wilco Ignition Coil	2.00
Alligator Clips	.10
1½ Volt Glo Battery	1.05
Battery Conn. Cord: Kit .40; Assm.	.60
Glo Plug Clips: O&R .15; Spitfire	.20
O & R Snap Pack	.35

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(Cont'l U.S.A. Only)

We Stock All Brands of Dopes

Cement: A'gloss, Comet, Testors ea.	.25
Aerogloss Plastic Balsa Tube	.35
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Shining black finish with white markings complete a really striking airplane! As originally designed in 1932 for the King's Cup, the 100-hp DH Gipsy four-in-line air-cooled engine version, had span of only 24 ft. Subject should make a practical RC scale airplane.

Deep, full cowl for inverted engine lends that racy look. Ship disassembles for travel. Wing in two pieces; even the landing gear comes off. As a matter of fact, shopping bag can hold it.

The Comper SWIFT

By HOH FANG-CHIUN

If a real plane ever existed that makes a more beautiful, better flying model than the Swift, we've yet to hear about it. For Half A engines.

In model form the chunky Swift looks far bigger than its true size. For the finishing touch a dummy pilot's head with a strip of colored silk tied around the neck should bring ship to life.

► Free flight scale probably is the most "touchy" branch of aeromodeling, for competition models of this type must be light in structure, yet having good aerodynamic character. Consequently, they usually are weaker than most other types of models and may be damaged if incautiously handled.

The Comper Swift was not designed to be a hot contest ship that will bring home many trophies but rather as a robust fly-for-fun sports model that will last for years of enjoyable week-end flying. In designing the model, therefore, attention has been concentrated on producing a durable and easy-to-transport plane.

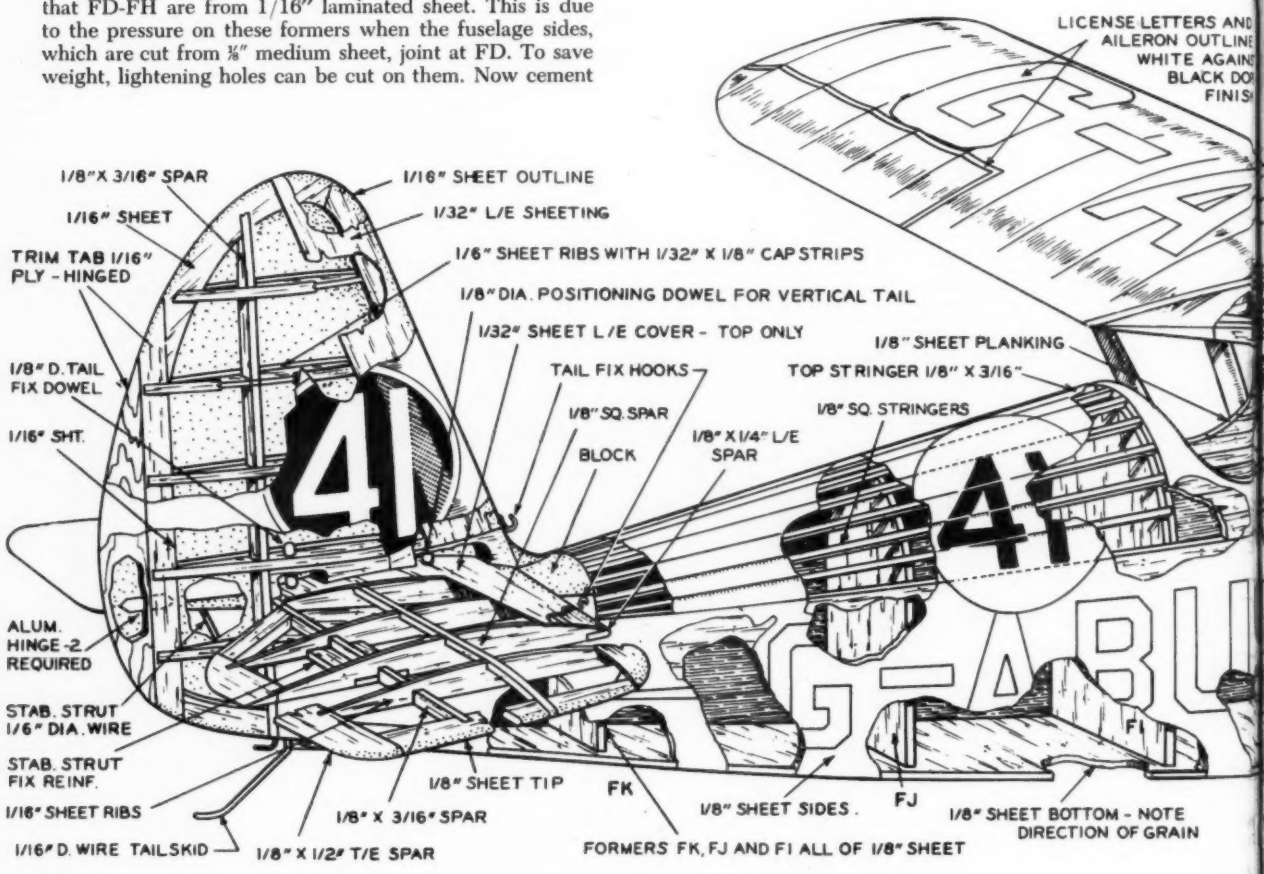
To solve the transportation problem most parts of the model are made detachable and hooks, tubing, and rubber bands are used for this purpose in the design. It is possible to put the model into an ordinary handbag, as even the

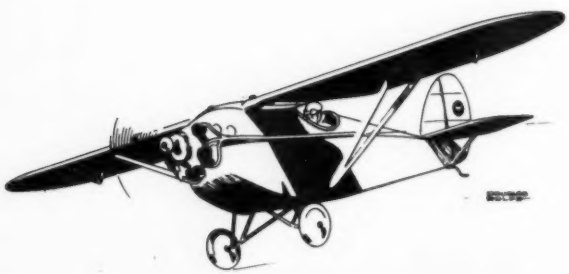
landing-gear can be detached from the fuselage. The model is accurate except for tail areas, which are slightly enlarged, and the added dihedral, which is indicated by the wing struts. These departures from scale were found necessary in order to make the model fly well with the least sacrifice of scale appearance.

An interesting feature is the shock-absorbing landing-gear. As can be seen on the plan, it is of a simple yet effective construction. It worked very well on the original model. My model had a German Taifun Hobby .06 diesel and this engine provided more than enough power, but any other engine with a capacity of .049-.075 cu. ins. displacement will do the job.

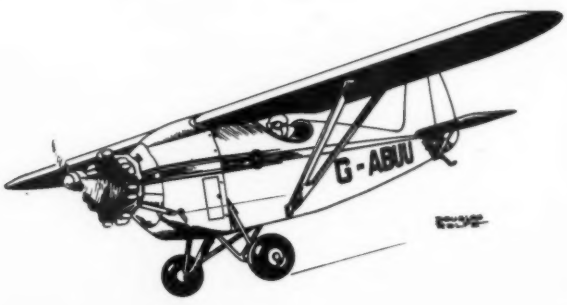
CONSTRUCTION: First, cut all the balsa formers. Note that FD-FH are from 1/16" laminated sheet. This is due to the pressure on these formers when the fuselage sides, which are cut from ⅛" medium sheet, joint at FD. To save weight, lightening holes can be cut on them. Now cement FG and FH to fuselage sides. When dry, the remaining formers can be cemented in place.

Next, cut ¼"x⅜"x4½" engine bearers from hardwood and cement them to FD and FE with plenty of cement. Note the built-in right thrust. Before planking fuselage top with narrow strips, be sure that the 3/32" inside-diameter aluminum tubing for landing-gear is securely fitted in place at FF and reinforced with plywood gussets, etc., as shown on the plan. Plank fuselage bottom with ⅛" sheet, grain crosswise, and cement a hollowed block at FD and FE. Saw firewall FC from ⅛" plywood and cement it to F.D. The fuselage can be roughly sanded at this stage before making the wing mount. (*Continued on page* 12)

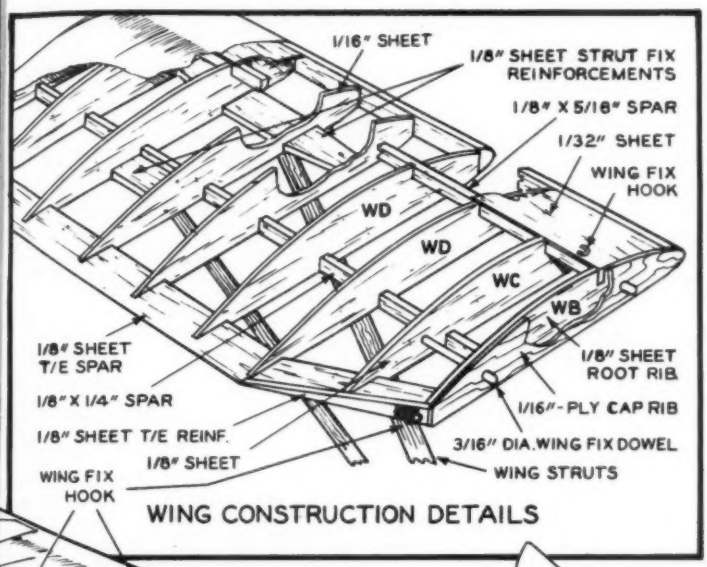




First Swift, designed by Flight Lieut. Nicholas Comper, was powered with geared-down PobJoy radial engine, had elliptical tail fin.

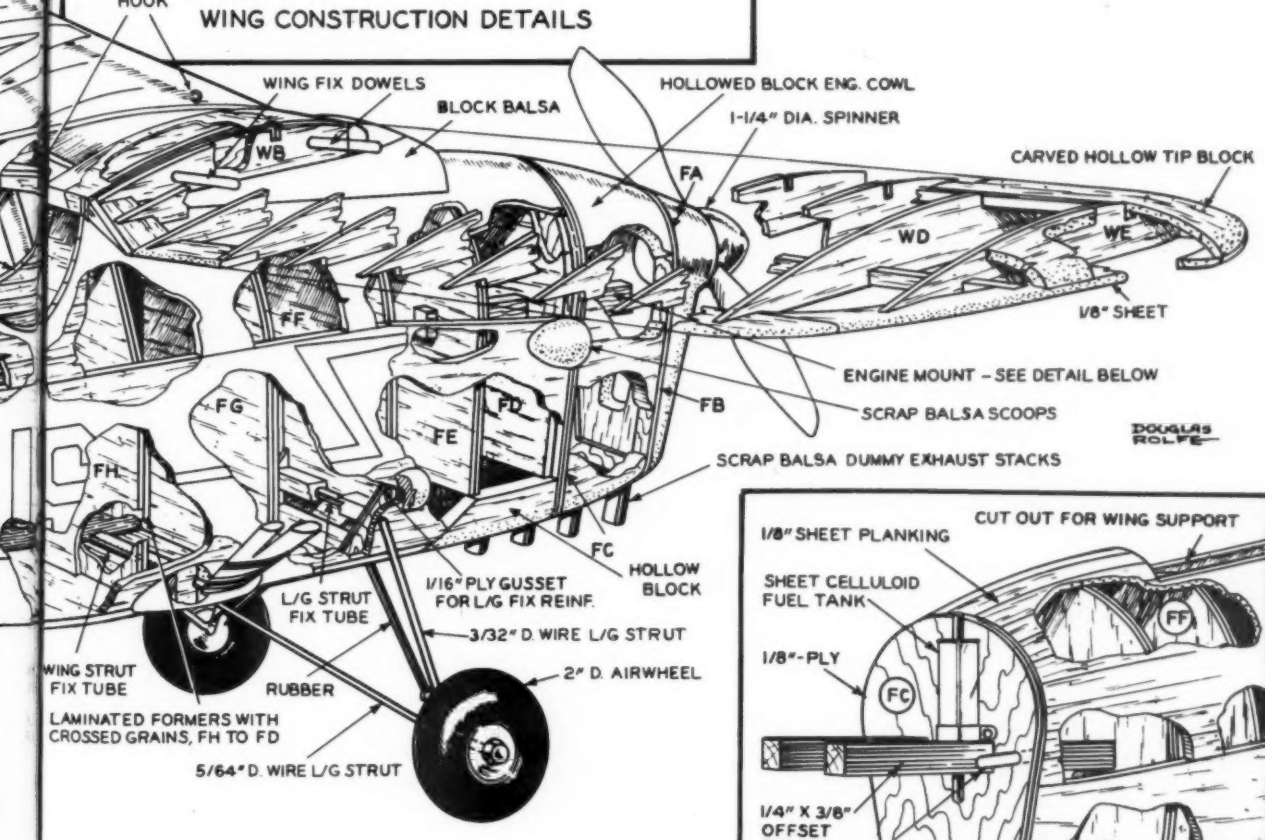


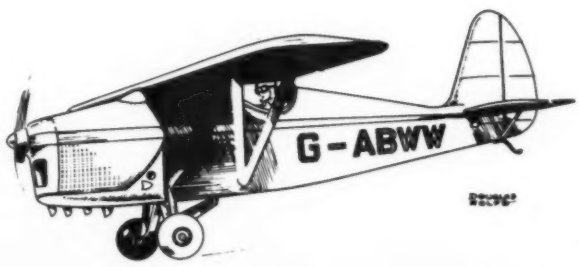
The 1932 model had low-pressure air wheels, bigger engine. In 1931 Swifts flew England to Australia, South Africa, crossed Andes.



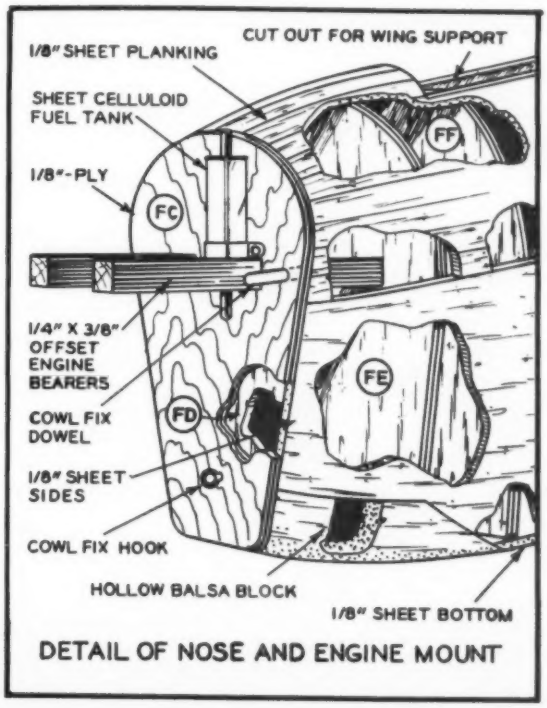
WING CONSTRUCTION DETAILS

Detail Plans and Text Continued Next Two Pages

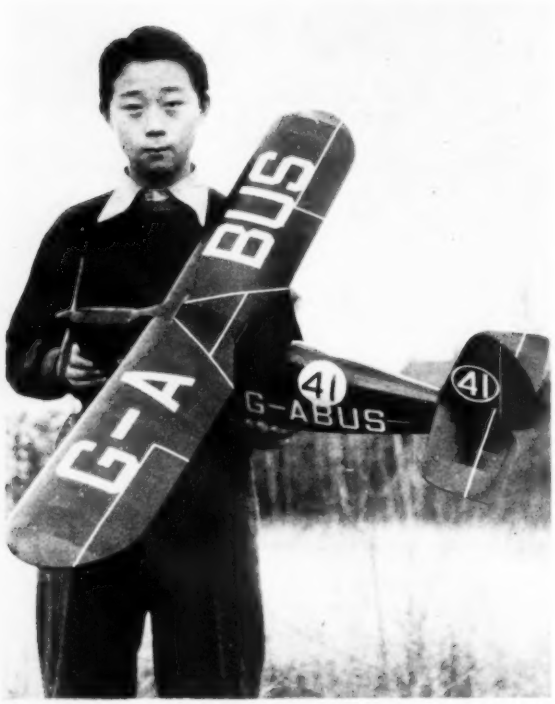




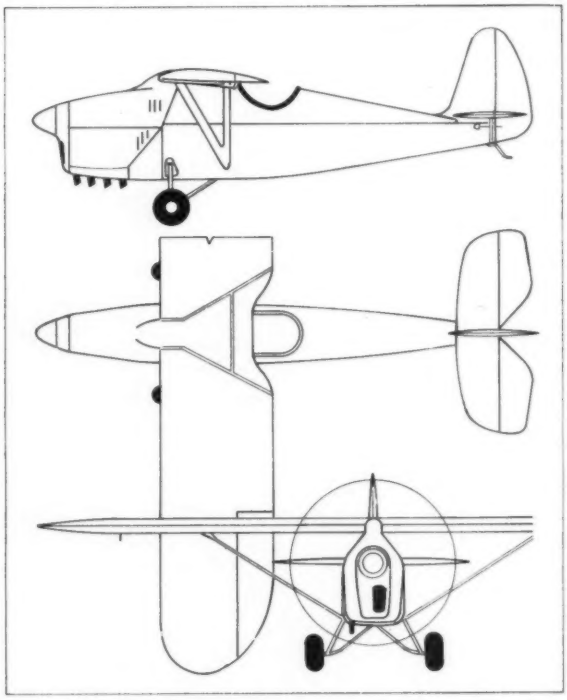
King's Cup Comper, of which two built—one for Prince of Wales, averaged about 157 mph. In 1933 Swift flew Madrid to Philippines.



DETAIL OF NOSE AND ENGINE MOUNT



Living in Kortebo, Sweden, author several years ago showed MAN pix of models as nice as the Swift, is among youngest of contributors.



Three-view supplied by Doug Rolfe illustrates the racing model as laid out 26 years ago. Swift production was begun in the year 1929.

COMPER SWIFT—Continued

The method of making the wing mount is clearly indicated on the plan by step-by-step direction, so no further remarks are necessary. The engine cowling is made of two soft blocks joined by 1/16″ plywood former FB. After sanding it to follow the fuselage shape, it is suggested, in order to reduce weight, that the cowling be hollowed to the extent that the sides take about ¼″ in thickness. The cowling is detachable and is held in place by a pair of rubber bands inside the cowling and to prevent movement, two small hardwood pegs, cemented to the fuselage, are inserted into it. The fuel tank can be placed inside the cowling. The 1/8″ sq. and 1/8″x3/16″ stringers can now be cemented on fuselage top between FI and FK. Add tailskid and cement a block on fuselage rear for stabilizer support. The fuselage is now ready for fine sanding before adding scale details.

The landing-gear is, as mentioned above, of the spring type and offers no difficulty in construction. However, to facilitate the finish of the fuselage, the landing-gear should be removed during the finishing process. The tail surfaces can be made next.

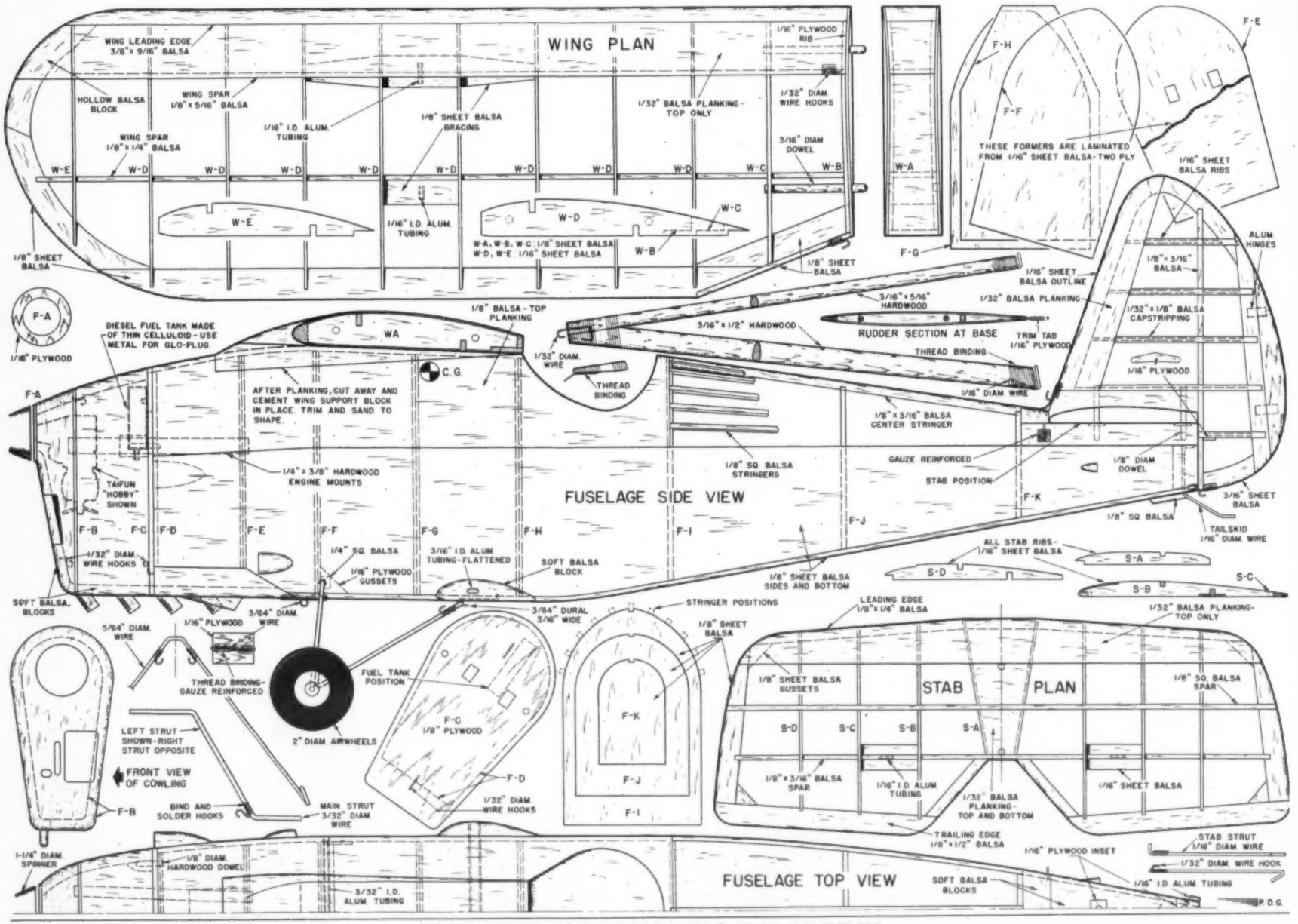
Start with the stabilizer. Pin down leading edge, bottom spar, tips and trailing edges directly on the plan. Add all ribs, which are cut from 1/16″ sheet. Be sure that SA is cut 1/32″ undersize at each side. Next, add all gussets, top spar, leading edge sheeting and center top sheeting before removing from the building board. Complete center section by covering the bottom with 1/32″ hard sheet. Two ⅜″ long 1/16″ i.d. aluminum tubings are cemented and bound to underside of bottom spar between SB and SC as shown on the plan.

Pin down fin outline from 1/16″ hard sheet on the plan. When it is thoroughly dry, it should be carefully removed from the building board and the remaining work is completed "in air". First cement the spar in place and then add all 1/16″ sheet ribs. When this is done, add leading edge sheeting and cap strips of 1/32″ sheet. The trim-tab is cut from 1/16″ plywood and fixed in place with soft aluminum hinges. A soft block is now cemented in place as the plan shows and shaped to fit with the stabilizer. Two 1⅜″x⅛″ diameter hardwood dowels are inserted through the stabilizer into the fin and cemented securely in the fin block. The tails are now ready to fit to the fuselage. By adding hooks, tubings, etc. to the tails, they are ready for covering and finishing.

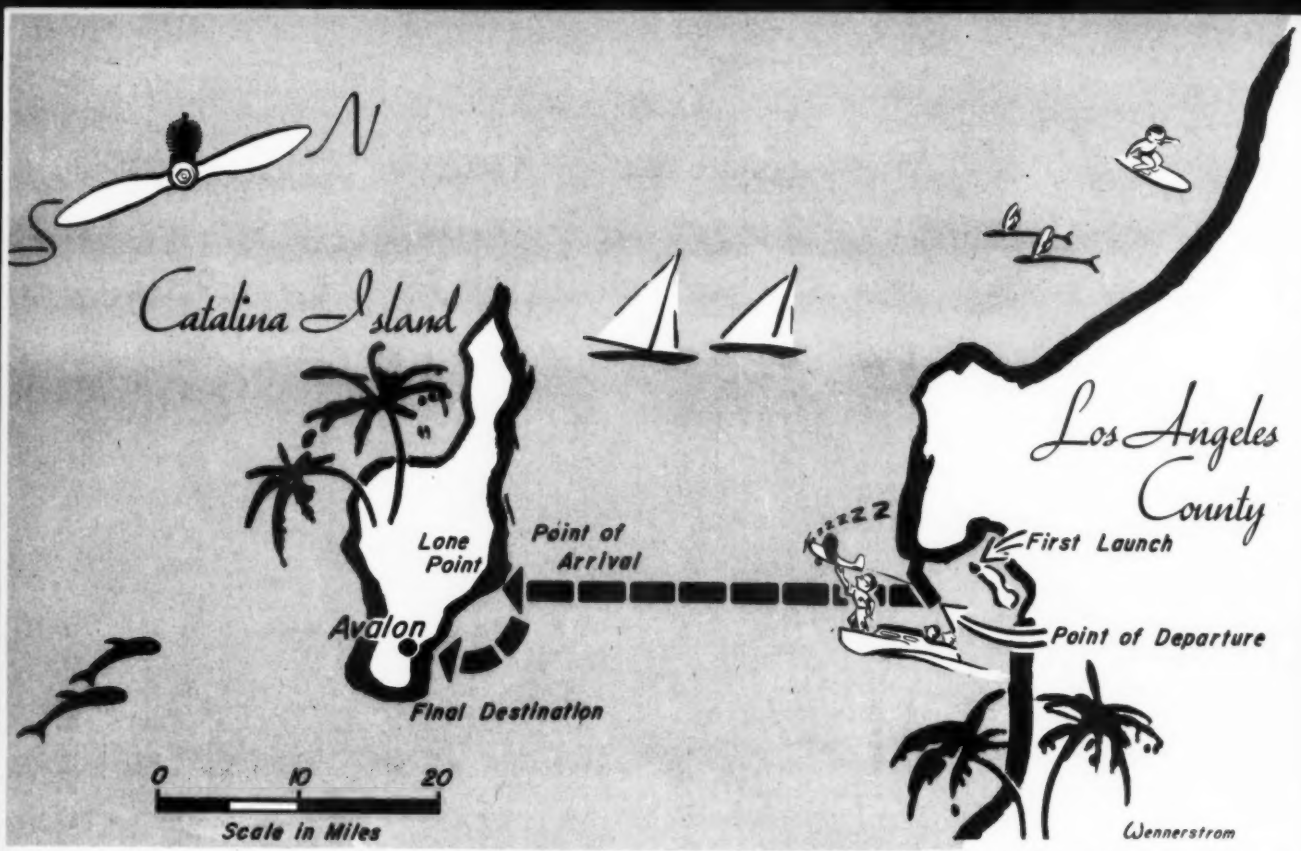
The wings have conventional construction. Begin by pinning down leading edge, rear spar, ⅛″ sheet tips and trailing edge on the plan. Add all ribs, top spar and 1/32″ leading edge sheeting. When they are dry, remove them from the plan and add plywood rib, hardwood dowels, wing strut tubings, etc. The wing struts should be made of spruce or similar hardwood and shaped to a streamlined section. They are shown true size on the plan and give the correct model dihedral. The upper ends of the struts slide into aluminum tubing fittings, which are cemented on the underside of the wing as shown on the plan. The bottom of each strut has a small hook inserted into a flattened aluminum tubing, which is extended through the fuselage, and is held in place by a rubber.

The structure of the model is strong enough for any covering material. The original model was covered with silk, but Silkspan or Japanese tissue can also be used. It is suggested to fill in grain on balsa surfaces with a couple of coats of sanding sealer (wood filler) and sanded between each coat before covering. After covering, the model was given four coats of clear dope and two coats of black dope, the last coat being sprayed. The trims, registering letters and control surface outlines were masked off by transparent tape and hand-painted with one thick coat of white dope. Since the original model was powered by a diesel, nitrate dope was used exclusively.

If a glowplug engine is to be used, then use hot fuel-proof dope (Butyrate dope). Before attempting any hand-launched test glides on tall grass or similar soft surface, be sure there is no warp in the model and the center of gravity is located as shown on the plan.



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.



To plane and boat RC fans, the Catalina Channel long a challenge. Nearly 30 miles over water may not sound like much on paper, but . . .

Flight To CATALINA

For the author and his friends, simple idea of flying a model airplane to Catalina became a two-year adventure—story of interest to all modelers, radio or otherwise. First of two parts.

by KEN WILLARD

Bill Glick, Harry Callas, Dick Schumacher, on Harry's speedboat. In foreground, the Avalon Dreamboat. Flight failed due to interference.

► Early in 1955 my seaplane, "Dream Boat," was getting a lot of attention. It was amphibious, and it was the first model to have the "kick-up" elevator system. It used the Babcock BCR-3 single-channel receiver.

Stu Babcock suggested a flying boat with the BCR-4 three-channel receiver because of the trimmable elevator and motor control.

When I saw the big volume of empty space in the hull, right underneath the center of gravity, to carry a lot of fuel, the idea was born. Could it carry enough fuel to fly to Catalina? Stu Babcock, Dick Schumacher, Bill Glick and Doc Townsend were all enthusiastic. We had a mission!

Bill Glick agreed to make the wing and I was to build the hull and the tail. The wing was routine except for the center section and engine pylon. A Bonner simple escapement would be buried in the pylon to actuate an exhaust baffle for two-speed engine control. We planned to set the low speed so that the airplane would have a very gradual rate of descent. The pylon had to be sturdy because the flying boat would weigh in at 9½ lbs. at the start of the flight—2¼ lbs. for fuel.

Ship that finally made it, the Avalon Breathless (scale-up from MAN plans). Six-foot plane used K & B .15, four Walker pressure tanks.

When we selected a K & B Torp .35, Johnny Brodbeck made up an exhaust baffle. Fuel consumption tests indicated a pint of fuel would run for 24 minutes at full rpm; at low speed a quart of fuel would run for about one hour. We decided to carry an additional four oz., a total fuel weight of 36 oz.

The tank had to be about four inches below the intake. We thought of several things: a metal tank pressurized by bleeding off some of the crankcase pressure was too complex; a metal tank pressurized with a CO-2 cartridge ditto. A large scale Jim Walker type pressure tank using a fuel regulator looked good. We solved this with a surplus weather balloon. These balloons uninflated are about seven inches long, will easily hold 2½ lbs. of fuel without even stretching the rubber. They do not lend themselves to being completely flattened out, but we figured we would be able to run off all but perhaps an ounce or so of fuel.

Either in high or low speed the balloon tank could be raised and lowered through as much as 10 inches without any apparent effect on the engine. The final fuel system was simplest; the balloon connecting directly to the spray bar with a long neoprene tube.

Using the BCR-4 three-channel radio, we set up a Babcock motor servo, using two channels for full trimmable up and down elevator. The third channel actuated a Babcock compound escapement for the rudder, and on which the third position closed the circuit to the motor control unit. Since the flight was going to be at least an hour long, we had a long rubber band. We would have 1,200 usable commands; averaging a command about every three seconds. For a battery pack we used two 30-volt hearing aid batteries in parallel for the B supply, six pencells in parallel for the A supply, and six pencells alternately in series and parallel for the escapement and servo.

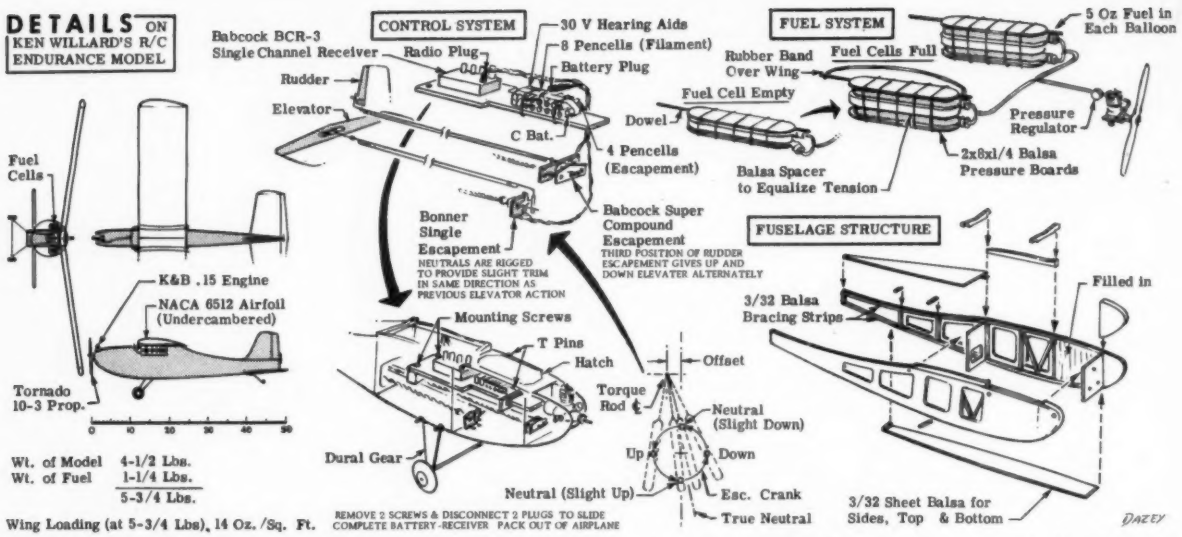
Through the summer of 1955 the big flying boat gradually took shape. We did beef it up for the water take-offs and landings. We fibre-glassed the forward part of the bottom of the hull back to the step; the bulkhead at the step was 3/16" hard plywood.

We had to make sure that all openings would be almost water-tight. The big opening underneath the wing we sealed, using Dr. Scholl's adhesive foam. This is a fine type of foam rubber with a sticky substance on one side. It is about ⅛" thick and it comes in flat pads. We attached it on to the edges of the hatch and then when the wing was snugged down tightly by the rubber bands, no water could get through. Back at the tail, where the escapement rubber came out, we made a snug fitting plug, and used grease as a water repellent.

The switch had to be accessible from the outside, yet waterproof. A "blind" baby bottle nipple was fitted over the switch, held in place with Pliobond cement. Thus the switch was completely waterproof, and yet could be flipped on and off. The silk covering had seven coats of clear dope.

Doc Townsend was convinced a good spray job could be put on thin enough to only add a couple of ounces of weight, and yet thick enough to give a good bright color scheme. His estimate turned out on the nose, just about two ounces of additional weight.

Because of the wide hull (about 10⅛" wide at the step) the boat sat high in the water. If you dipped the wing tip into the water it had such good water stability that it would lift the wing tip out of the water. We did not need wing tip floats. Instead, we made up some small balsa hydro-skis which attached directly to the wing with rubber bands, and would knock off easily. The only time they touched the water was if the boat got cross-wind, and the wind going underneath the up-wind would tilt the boat so that the down-wind (*Continued on next page*)



Frank Dazey's drawing illustrates the systems worked out in Breathless. Several types of planes and radios proved this plan best.

FLIGHT TO CATALINA—cont'd

hydro-ski would just barely touch the water. The boat would weather-cock into the wind and right itself.

Dick Schumacher, who had experience with trim control agreed to give me a little instruction. On the third flight he handed the transmitter over to me and said "All right, you try it." He had his airplane at about 200' altitude. I made right and left turns.

Dick said, "That's not what you're here for; now try the elevator," so I did. I pushed down elevator. The airplane leveled out and then started into a shallow dive. The dive began to steepen. I tapped a little up elevator in; nothing seemed to happen. I tapped a little more up elevator—again nothing seemed to happen. By this time the airplane was in about 50° dive. I pulled back on the stick and held it. One of the spars had been slightly cracked, so when I pulled the full up elevator that spar let go, off came the wing and down came the rest of the airplane.

So Dick was to be the pilot. He could not get away on weekends for about two months, and it was already late in August.

Bill Glick and I decided that we could get an idea of the flying boat's water handling characteristics without actually taking it off. If it should get off the water we could always cut the engine back before anything serious happened. We had already made the decision that we would not fly this airplane over the land. The big long nose was wonderful for working on the water, but if a mishap were to occur on the land that long nose would be the first thing to hit, and it would probably be demolished. We decided to run test flights on fresh water. If the airplane were to get dunked nothing serious would happen, such as would be the case in salt water.

So, early one Saturday morning, about 5 o'clock, Bill and I drove 55 miles out to Puddingstone Dam and started the tests. We fired up the engine, using a small balloon tank, flipped the engine control into low speed, and sat the boat in the water. Majestically it pulled away from our row boat and started taxiing across the water. We didn't have a water rudder because we didn't feel it necessary. As soon as I gave the ship right rudder it began a turn of about 30' radius, turned around and came back towards the boat. I steered it away, and we had ourselves a ball just taxiing the big boat around until it ran out of fuel.

We decided to do it again. So we refueled with the small balloon tank, fired up the engine, put it into low speed, put it over the side again. I said, "Man, doesn't that airplane handle nice. Now if I were not to touch the elevator control at all, and just fly it like it was a 'rudder only' airplane, I couldn't get into too much trouble, now could I?" Bill answered, "Why not?" That .35 Torp roared into action. The flying boat leaped forward, jumped up on the step. The speed picked up, 20, 25, 30, 35, far faster than I knew it was necessary for it to fly, but it wouldn't take off. I flipped the motor control back into low speed, and when it settled back into the water I turned it away from the shore, and just then it ran out of gas.

The handling characteristics at both low and high speed were so good we decided to have another try. As soon as it reached what looked like a good flying speed I beeped some up elevator. The boat was now once again screaming across the lake. I beeped in more up elevator, to no avail. I had to go back into low speed, because of the far shore. It just wouldn't take off. The elevator was in full up and, if the boat had gotten off the water, it probably would have gone up and over in a fast loop!

The next time I set the elevator at neutral and promised myself I would not use up elevator. Perhaps the long planing hull was dragging at the tail, so this time, as soon as the ship got up on the step, I tried slight down elevator. The tail actually came out of the water and the boat was skittering along on its nose. It hit a small wave, actually skipped into the air. What happened next I can't remember. As the flying boat skipped into the air it rose in an arc of about four feet from momentum, then dived straight into the water at an angle of about 40°. But no damage resulted.

I decided that the angle of incidence was not high enough when the plane was on the water for the wing to create lift, so I increased the angle of incidence, but the following week's trip proved fruitless because the radio apparently had been effected by the dunking.

The following weekend Dick was available. We sat the flying boat in the water, Dick took the transmitter, put the engine in high speed, and the craft, after about a run of 150 feet, rose into the air.

When the plane reached an altitude of about 100 feet, climbing at about 25 mph, Dick started to level it out. He was an old hand with the three-channel equipment, but the boat took him by surprise. As soon as he put a slight amount of down elevator in the control the boat leveled out all right, but its

(*Continued on page* 54)

This young man is making his first try at built-up fuselage. So much sheet balsa now used that comparatively few hobbyists master basic business of laying out side frames, cross pieces.

Let's Get STARTED

PART THREE

From the secret files, runway busters: Profile trainers are fine, says the old boy, but bigger ships do good job!

by I. N. STRUCTOR

There are two ways to the top; one, free flight, the other, control-line or U-control. The first teaches more about airplane theory—why a crate flies. But U-control is surer and faster, for getting an inexperienced chap into the air. Free flight is not the best medium for the hobby shop dealer to work with. There are hundreds of subtle fine points and things you have to find out for yourself. The clerk finds U-control easier to describe.

In our family, the old man was a free flight man. So it happened that the dealer who got us going on ukie, gave us an old Top Flite Trainee with an Ohlsson .23. This dates us, to be sure, but three growing bean stalks did real fine on all .19 powered profiles. About every three years, we go through this profile stage—and the crates sometimes get handed down to the next line. There are plenty of excellent profiles. Trixter profiles were our favorites but, after all, a profile is a profile, and anything by Testor, Comet, Darwin, and practically everyone else, should work as well.

But why the .19? What's the matter with .049 ready-to-fly jobs? Now, there's plenty to be said for smaller models and the plastic ready-to-go jobs, which are feats of design and manufacturing that demand respect. We went along on the dealer's choice of a bigger trainer because of the tremendous gap that results otherwise between a wee job and the big, all-out stunt crates which every red blooded pilot sooner or later wants to wring out. The Trainee had small elevators. Over control—everyone is guilty of wicked overcontrolling and dizziness at first, was minimized. The ship would do just a mild wing-over—but it was sure fire for smooth take-offs, straight-and-level, and one-piece landings. In the deep grass, the bigger size and power enabled it to get off, and landings were not tripped over so easily. The boys, frankly scared at first by the noise of the bigger engine, quickly felt at home with engines more comparable with those they'd have to work with on the many stunt kits to come later.

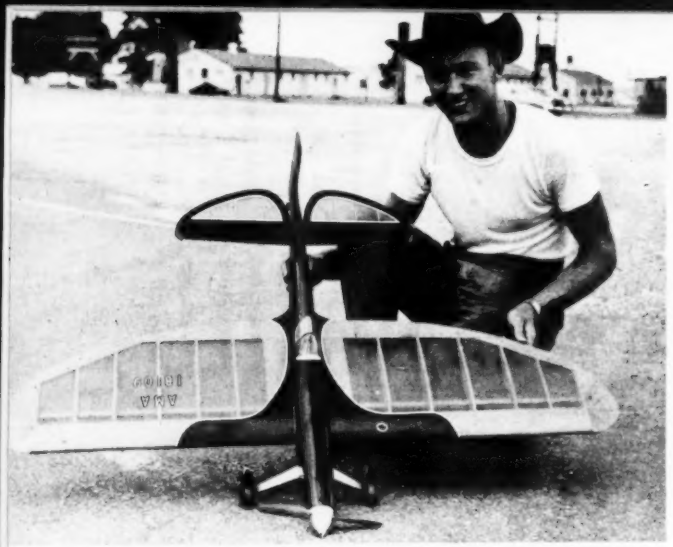
Did they make mistakes? Pa's technique was to hand the ambitious flier the profile kit with the instructions: "Make this and fly it. When you learn to fly it, call us down to the park and prove it!"

Two days, or two weeks, later, the ace of the moment would be flying smooth as silk. One chap installed a wedge tank on the inside of the circle. Every time the crate would take-off and accelerate but, as soon as centrifugal force toward the outside of the circle kept fuel from the engine, the .19 would conk out. Paint in the hinges, and buckling pushrods (always support the push rod) were commonplace errors. Unlike the old Trainee, the Trixter profile has big flippers. These cause galloping take-offs and some crack-ups on early flights. Afterwards, we found that small flippers, best on a trainer, were poor preparation for stunters. The first stunt model take-off usually looped into the ground. But, used to big flippers from the beginning, stunt job take-offs were mastered. So big flippers in trainers are best after all. Anyway, the profile can be cemented together again and again. Another good point for the beginner is the upright engine. It is easily primed, choked, operated.

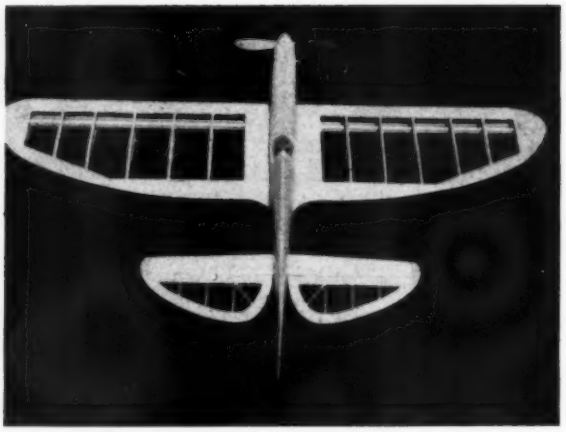
If you want a small-engine starter, models like the Berkeley Mini Zilch, etc., will do the job.

Our greatest problem—and probably yours too—is the fact that control-line kits are not complete systems. Many have stated on the plans, "Install your favorite control system here." Our boys drew a blank on such kits. And what do you do about bellcranks, leadout wires, the control wires themselves? What about a handle? How are the wires connected, or stored on a reel? The kit probably does not contain a tank—certainly not a fuel line. Ask the dealer what is missing from a kit. You may end up having to spend as much as the cost of the kit to obtain the accessories necessary to finish the model. Wheels may be so bad that new ones are required. Engine, fuel, props, fuel pump, etc., add up to a pretty package.

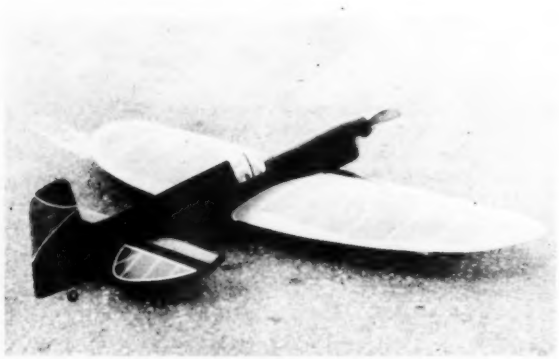
All boys like to paint. The uncolored model is not an airplane unless it is decorated. Nobody told our crew about incompatible dope materials. Various brands and types of dopes may not mix, or always take over each other. Goes for wood filler too. Sometimes the pretty colored dope would come off in sheets! From the sanding sealer up, stick with one brand and one type of dope. Things are fairly standardized these days with butyrate dope which is fairly fuel proof. Nitrate dope isn't and will melt under raw fuel, allowing things to fall apart. Cement is not fuel-proof unless the tube so states and it must be protected by fuel-proof dope (*Continued on page* 40)



Built during the author's stay at Bartow Air Base, Fla., design an immediate success. Weighed 30 ounces, flew 80 mph, on 65 feet.



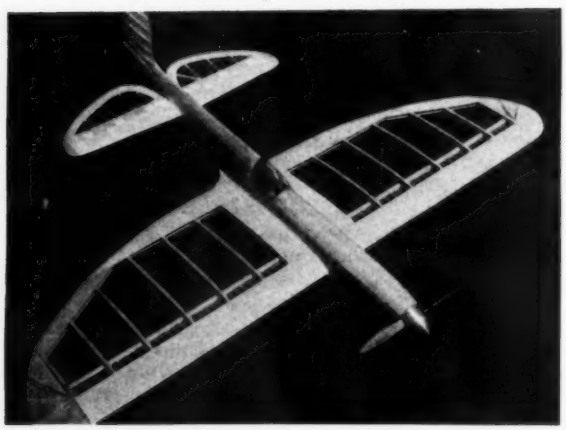
Tapering fuselage, graceful planform outlines add something extra to appearance. Aircraft glides well, and makes excellent landings.



Profile distinctive for a stunt design. Long fuselage, inverted engine, cause the ship to sit almost horizontal to ground. Helps take-offs.

The LIEUTENANT

by LEROY F. DUCHARME



Main spar, D-section leading edge, give great strength. Ribs are cap-stripped. Seven coats clear, black fuse, red silk wing. A looker!

Top praise of .35-engined stunter has come from the competitors who flew against it. It's no run-of-the-mill design.

► The Lieutenant is a contest stunt model designed to achieve peak performance and yet be a distinctive looking airplane. The long tail, semi-balanced elevator, inverted engine and tapered elliptical wing were all designed for specific purposes.

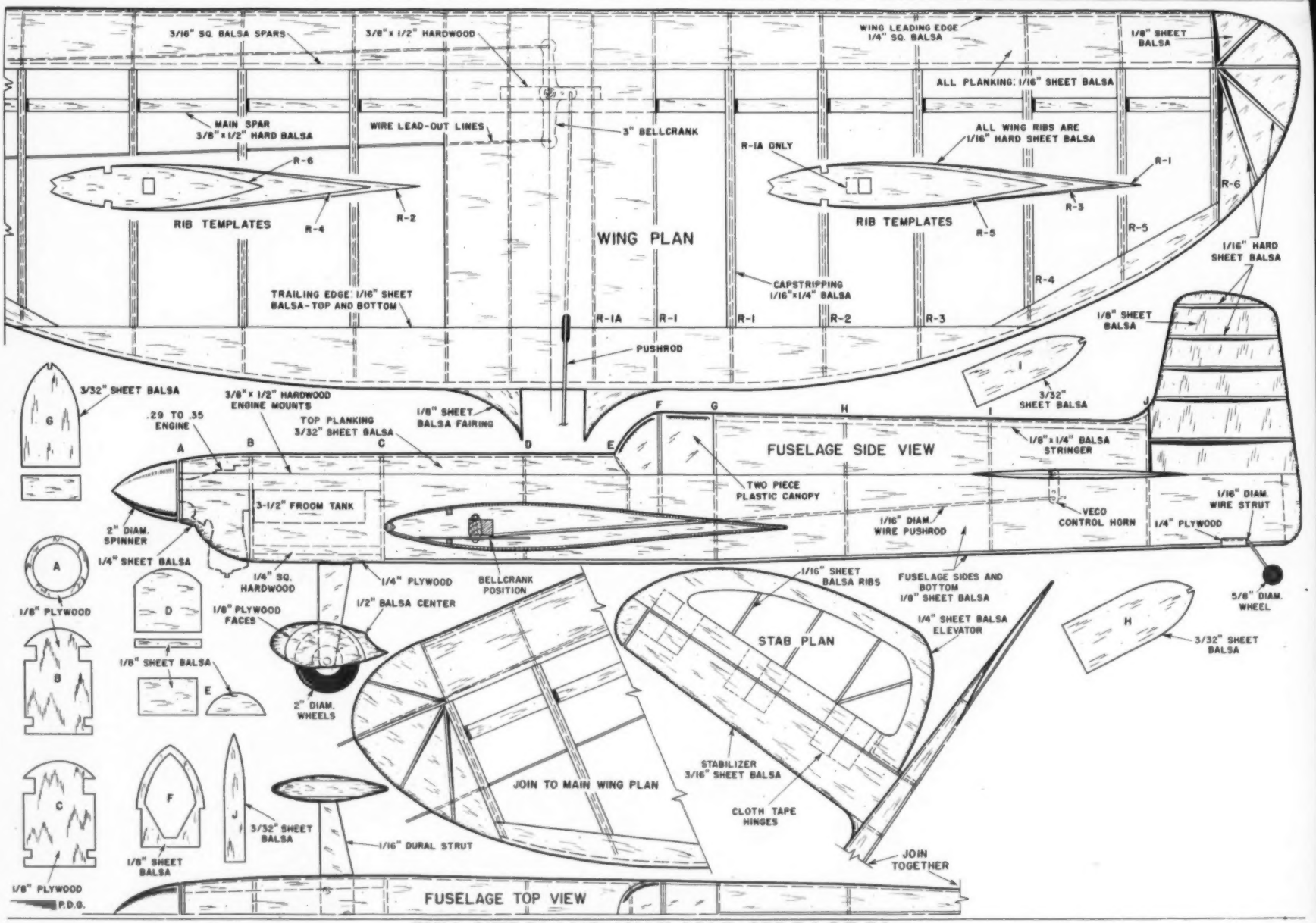
It all started with a very official letter stating that my career as an Air Force officer was to start in one month; at that time I was working in the experimental department of Bendix Aviation. We had just finished a project for the Hustler (B-58) and, therefore, I had some spare time. By the time the week ended, almost every engineer in the department had made comments and helped on the design!

The construction of the Lieutenant began at Bartow Air Base, Fla., after I soloed the T-28 and finally found some spare time. Rapid progress was not made until we learned that a contest was to be held in Tampa, Fla. The airplane was finished on Friday, tested on Saturday, and took first place in open stunt on Sunday!

The finished model weighed 30 ounces and was anything but slow: it was clocked at 80 miles per hour. Besides being a fast stunt model, the design produced a very good glide and excellent landing characteristics: the long fuselage and inverted engine installation enable the model to rest almost in a horizontal position—this also produces a beautiful take-off.

Flying the real thing proved that ample rudder area was necessary for smooth flight in wind; therefore, the model has the rudder blended with the fuselage producing the needed area and an extra clean design. The rudder had to be made extra light because of its location: this was accomplished by using a 1/16" sheet outline with ribs cemented to produce the desired airfoil section and then silk covered.

The entire structure is built in a conventional manner, but here are a few helpful hints. Build the entire wing first, starting by joining the main spar and leaving the inside panel 1½" longer. Insert the controls, but do not cover until the entire model is finished. The wing is very easy to build despite its elliptical shape and tapered airfoil section (this makes covering the wing extremely easy by eliminating wing-tip (*Continued on page* 40)



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.

All About PULSE JETS

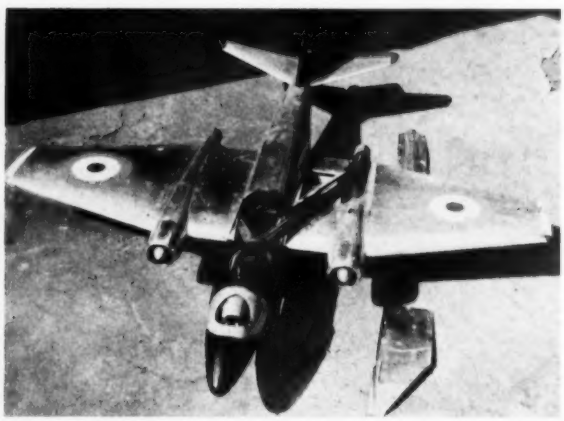
by P. G. F. CHINN

PART TWO

DATA: 10 TYPICAL MODEL PULSE-JET ENGINES

TYPE AND COUNTRY OF ORIGIN	CLAIMED ST. THR. LB.	APPROX. FREQUENCY C.P.S.	WEIGHT OZ.	OVERALL LENGTH IN.	OVERALL DIAMETER IN.	TAILPIPE DIAMETER IN.	REMARKS
U.S.A.							
DYNA-JET R.H.	4·25	220/240	16·0	21·25	2·50	1·25	PROTOTYPE OF NEARLY ALL FOREIGN JETS
M.E.W. 307	3·0	–	13·5	20·50	3·0	1·25	ORIGINAL LOW-PRICED JET. NOW WITH SPARK-IGN.
JAPAN							
O.S. TYPE II	3·75+	220/240	14·0	21·50	2·50	1·22	REACHED 155 MPH IN TESTS
TIGER JET M.I	1·75	250+	7·2	18·30	1·75	0·87	NEW SMALL JET BY KANEKO
U.S.S.R.							
RAM-1	2·2-3·3	150	11·3	33·66	2·52	1·34	STANDARD LOW-FREQUENCY DESIGN BY VASILCHENKO.
RAM-2	5·5	160/180	14·8	29·53	3·15	1·57	CONSUMES APPR. 7OZ/MIN.
GREAT BRITAIN							
DECOJET	3·0	180	20·0	24·75	2·50	1·00	OUT OF PRODUCTION
WEST GERMANY							
BWM RT 2000	4·4	–	17·7	22·05	2·56	–	OUT OF PRODUCTION
EAST GERMANY							
VICTORIA MD.I	3·5	–	12·6	31·61	2·52	–	INCLUDES GAS TANK
CZECHOSLOVAKIA							
BRAUNER	3·9	220/240	12·4	21·20	2·52	1·26	FOR HOME CONSTRUCTION OR GROUP PROJECTS

Concluding a unique and comprehensive discussion of the noisy "flying blow torches," the author reviews units of this and other countries and presents tips on maintenance.

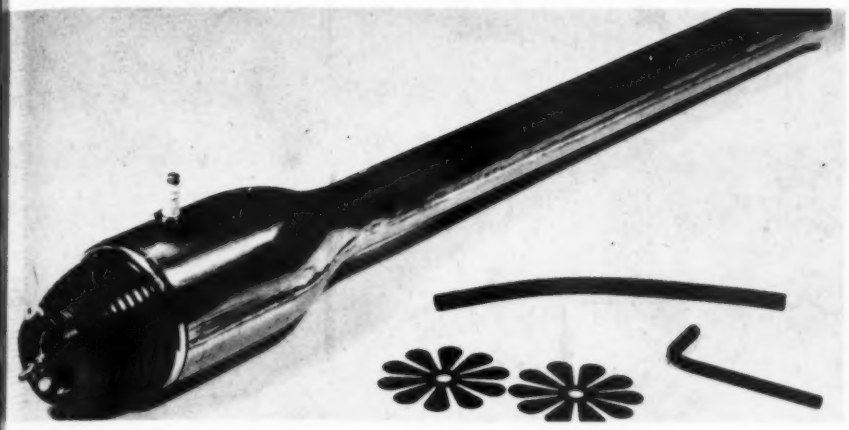


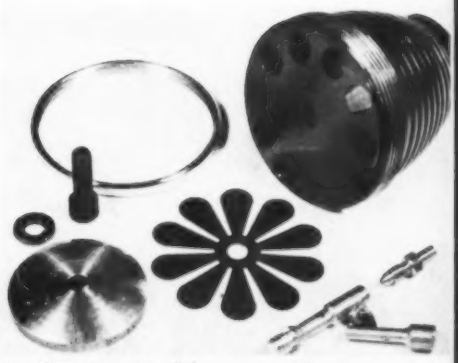
Tail-pipe installation on all-metal Canberra built by Goro Hagiwara, Japan. Novel jet engine has Y-shaped pipe, two exhausts.

► The first model pulse-jet engines, the Minijet and the somewhat more compact and powerful Dyna-Jet, appeared on the market in America in 1946. The Dyna-Jet has remained the number one American pulse-jet ever since.

The design of the Dyna-Jet is protected in the U.S. under various patents first filed in 1946 and accordingly, while it has had competitors, it has not been closely imitated by other domestic manufacturers. Outside the U.S. the story is different and the Dyna-Jet has, in some instances, been closely copied—even to the extent of having parts interchangeable with those of the American original. In other engines, the basic design of the Dyna-Jet has been retained but with altered proportions. A case in point here are certain of the engines produced in the Soviet Union, in which a considerably lengthened combustion-tube is employed, thus reducing the resonant frequency of the tailpipe to produce a somewhat lower static-thrust for a given valve area.

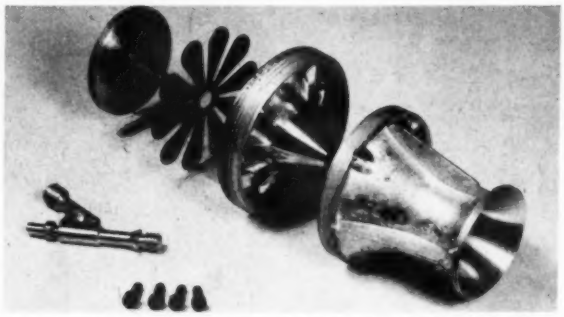
The first Dyna-Jet saw the light of day early in the spring of 1946, the invention of William L. Tenney and Charles B. Marks. It was the result of months of continual cut-and-try experimentation, for there was next to no published technical information concerning the Schmidt-Argus tube principle on which the Dyna-Jet was based and Tenney and Marks' only guide was a brief inspection of a German V-1 motor.



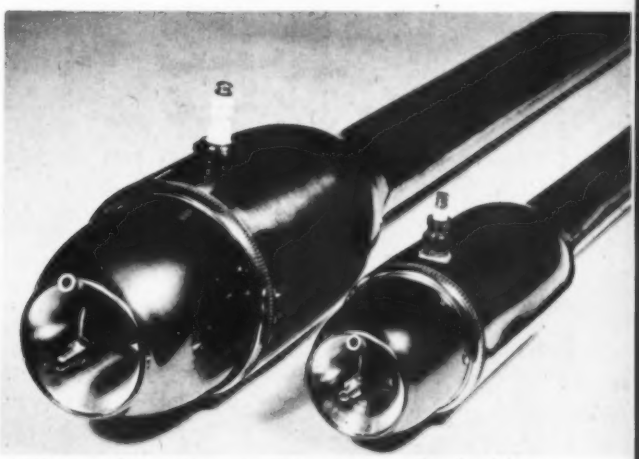


American Dyna-Jet, left, comes with spare valves, Allen wrench, fuel tube. Above—Engine is notable for excellent finish of intake ports.

Also available in the U.S. is the Japanese O.S. Type 11 jet. It has recorded speeds up to 155 mph. Scale jets popular in Japan.



Valve head parts of the Japanese O.S. Type 11. Construction differs from American Dyna-Jet in the use of the two-part casting.



Tiger Jets, made in Japan, come in two sizes. L-1 has head interchangeable with Dyna-Jet. M-1, right, weighs 7.2 ozs. Well made.

Burned and distorted valve petals make starting difficult—replace before head face is damaged. Pitted head-face surface can be cut down by grinding (see text) on piece of glass, as illustrated here.

It has often been claimed that the model pulse-jet is a far more efficient engine than its full-scale counterpart and this is largely true, but it is only fair to remark that this is not so much due to the ingenuity of the tailpipe, the frequency of which, as we have previously noted, is automatically raised as the tailpipe is shortened towards model proportions, thus increasing the number of cycles within a given period and improving specific thrust figures. On the basis of specific fuel consumption—i.e. of fuel consumed per pound of thrust per hour, the model jet is roughly on a par with post-war full-scale pulse-jets.

The current Dyna-Jet Red-Head, has a nominal static-thrust of 4¼ lbs. and individual examples have, in fact, been tested to give in excess of 4½ lbs. The engine certainly has more speed records to its credit than any other model pulse-jet thus far built (the jet model airplane records in most western countries having been set with Dyna-Jets) and its total number of contest wins, all over

All About PULSE JETS–

Continued from preceding page

the world, is certainly more than those of all other pulse-jets added together.

As we commented earlier, the pulse-jet is an exceedingly simple device, and, in miniature form, it has been further simplied by the use of a less complex reed-valve design. The Dyna-Jet consists of only six basic components. The front of the engine comprises a machined aluminum alloy part generally referred to as the valve-head. It has a venturi shaped air entry, of 15/16 in. bore at the throat, which splits up into ten inclined 11/32 in. dia. passages forming the valve ports. These are covered by the ten petals of the blued and tempered Swedish steel reed-valve attached to the rear face of the valve-head. The valve is located by a single Allen-head screw and an alloy valve retainer, domed on its front face in such a way as to restrict the flexing of the valve petals to a gentle arc.

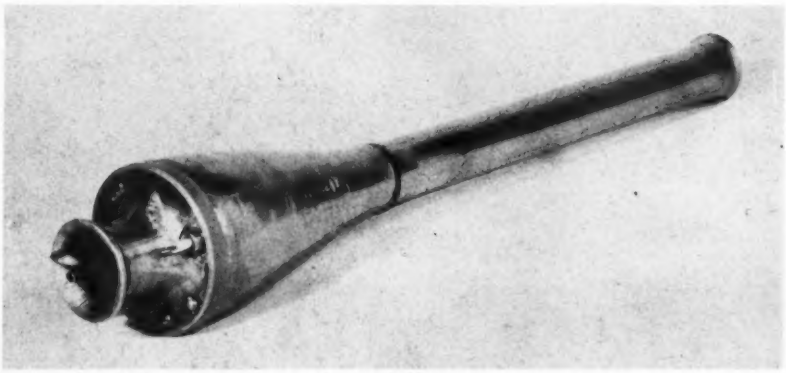
Mounted in the center of the air intake is the combined fuel jet assembly and air-hose connector, known as the "flowjector." Accurate alignment of the air starting jet with the fuel jet is important for ease of starting and Dyna-jet flowjectors are carefully jigged during assembly and are strongly made to resist distortion with normal usage. The fuel metering jet is of brass and a No. 4 jet is fitted as standard. Alternative jet sizes are also available.

The combustion tube, comprising 2½ in. diameter combustion chamber and 1¼ in. tailpipe, is now specially made for Curtis Automotive Devices Inc., the Dyna-Jet manufacturers, by R. S. & G. Company of Brownsburg, Ind. It is of stainless steel in two halves, Heliarc welded and has a brass threaded collar at the front end into which the valve head is screwed and held by a stainless steel lock ring. A standard Champion VR-1 ⅜ in. spark-plug, with side electrode removed, is used.

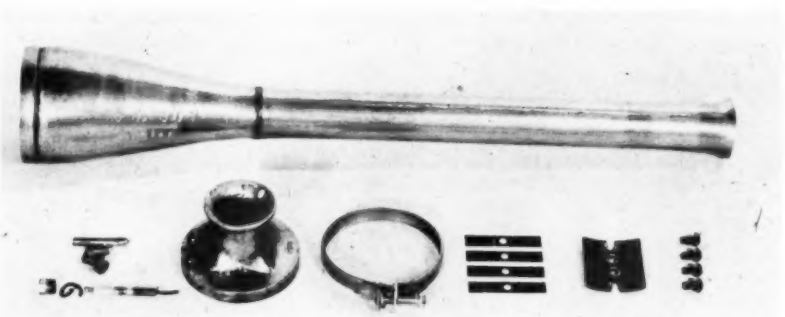
Outside the United States, the country where jets have received more attention from commercial manufacturers than anywhere else, is Japan. First on the market to sell in numbers, but now out of production, was the Eureka jet. This was broadly on the lines of the Dyna-Jet but with a combustion tube fabricated in three parts and a four-port, instead of a ten-port valve head. The engine had a static thrust of 2.6 lbs. and about 1,000 of these jets were produced, not a few of which were used by American Service modelers stationed in Japan: especially as power units for the quite impressive Eureka scale jet U-control kits. A few Eurekas were also produced to special order with eight-port valve heads.

More closely resembling the Dyna-Jet, is the Tiger-Jet L-1 which came on the market in March 1953. Made by the Tiger Engineering Co., Ota-Ku, Tokyo, under Mr. Kisaburo Kaneko, who previously made valve heads for Eureka, this has a ten-port valve head which is actually interchangeable with that of the Dyna-Jet. Externally, the L-1 head differs from its American prototype in that fins are dispensed with and the exterior streamlined with the aid of a neat spun aluminum cowl. This is highly finished, color anodised red and is attached with three countersunk plated screws. Internally, the L-1 has a thicker valve material (.007 in. against .006 in.) and the valve ports are not so smoothly finished as those of the Dyna-Jet. Since they are of slightly smaller bore, however, (8.5 mm. or .335 in. as against .344 in.) and are accurately spaced and aligned, these ports can be polished out quite safely.

From time to time it has been suggested that a smaller version of the Dyna-Jet type motor would be welcomed, especially for scale type jet models. To date, however, only a little work has been done in this direction. It has been further suggested that this is because of some inherent size limitation to successful pulse-jet operation. There appears to be just a grain of truth (*Continued on page* 46)



Moderately priced M.E.W. 307 now has electrode fitted in valve head for spark-ignition.



Dismantled M.E.W. 307 shown many design differences between this and other pulse-jet units.

Unique rectangular ports of M.E.W. Makers suggest smoothing ports for maximum performance.

M.E.W. head is tapped out with stick through tail pipe. Chamfer to bear on two center screws.

Winner of the 1957 World Glider Championship, Slobodan Babic, of Yugoslavia, ran up the only perfect five-flight score. Europeans excell at Nordic, are past masters of glider techniques.

What Happened at Prague?

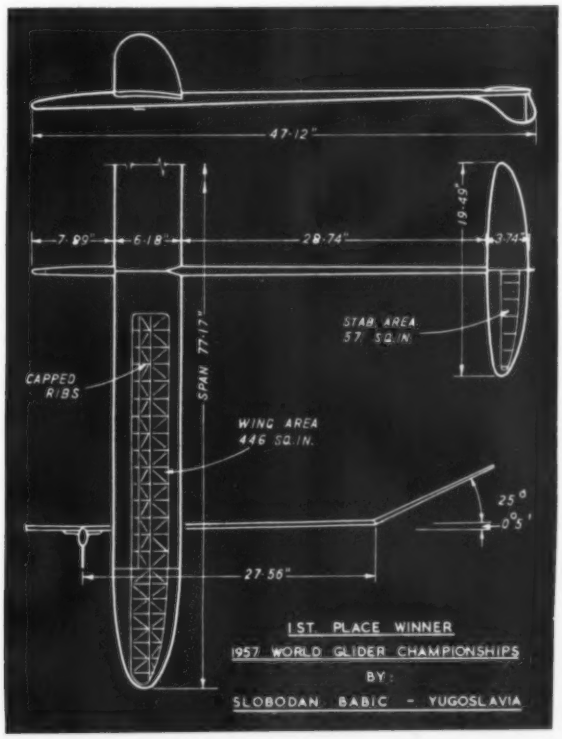
Held near Prague, the 1957 World Championships saw an almost clean sweep of speed and glider events by the East European countries.

Whichever way you look at the 1957 World Championships results, they add up to one thing: the almost complete eclipse of the Western nations by Russia and the East European countries. In the Glider event, the Russians took the team prize followed by Yugoslavia, Czechoslovakia and Hungary. West Germany was fifth, Britain and America ninth and tenth. In the individual placings, Yugoslavs were 1st. and 3rd., Russians 2nd. and 4th., a Hungarian 5th. and a Czech 6th.

In Speed, the Czechs took four of the first five places, with a Hungarian in the 4th spot. The Italians provided the only serious effort from the West, placing 6th, 8th, and 9th to give them second place in the team results. The Hungarians were hard on their heels, third; the Soviet Union fourth; Britain was ninth and the U.S. did not compete.

Have we any excuses? Well, no model meet is without mishaps and ill-luck. Many of the A/2 contestants were flying in conditions which were a trifle unfamiliar to them, but there is no doubt that the East Europeans profited from better pre-contest organization. In the speed contest, if Bill Wisniewski had been able to attend in person and repeat his 136 mph trials speed he could have won the individual award. Likewise, if Britain's Ray Gibbs had not suffered a fractured cylinder half way through his first flight, he might have repeated his last year's victory. However, a miss is as good as a mile and the results, following on (*Coninued on next two pages*)

Winners on dais, as in Olympics. Babic, center; Sokolov, left, Russia, second; Hadzovic, Yugoslavia. US got a 15th place, did not fly speed.



Ed Christenson prepares to launch US model; Gerry Thomas takes care of fuse. Ed landed once in river, totaled 12:16—good try.

Noted Russian A/2 exponent, Yuri Sokolov, took second. Russians now using balsa extensively, in addition to reed, usual hardwood.

WHAT HAPPENED AT PRAGUE — continued

so many recent notable performances by Czech, Hungarian and Russian modelers, only serve to emphasize that we have to pull our socks up and prepare for the World Championships really seriously if we are to regain the ascendancy in international model aviation.

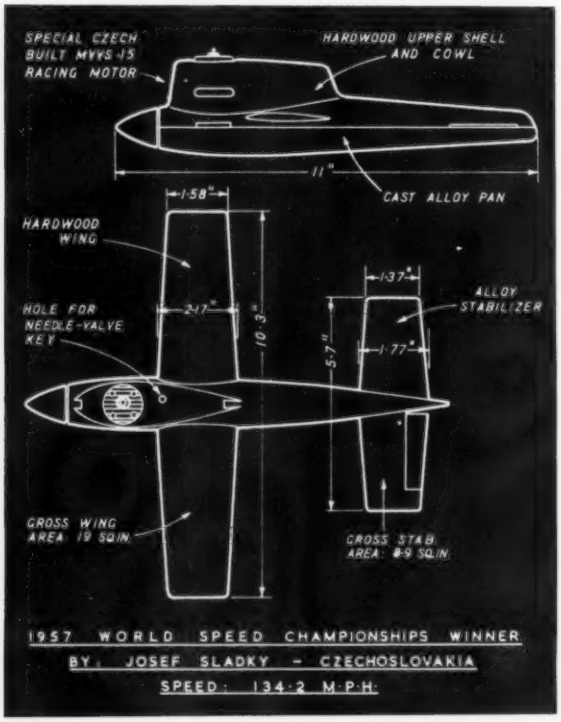
This year's events were for A/2 Gliders and C/L Speed (FAI Class I—.15 cu. in. motors) only, and were held in Czechoslovakia, because this country won both the Glider Team Championship and Speed Team Championship in 1956. The site of the contests was the airfield at Mlada Boleslav, a small town near Prague.

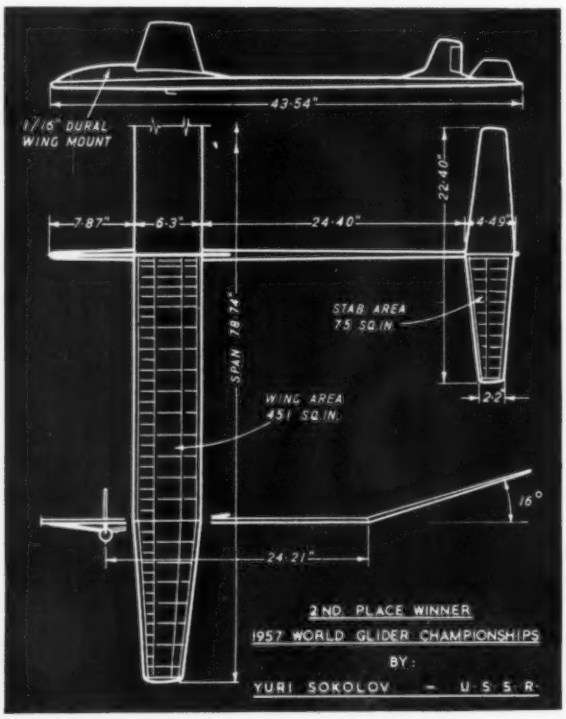
The contests began with the glider event on Friday, August 9, the previous day having been devoted to processing and test flying. As in all FAI events, each contestant was required to make five flights, with a three-minute maximum flight time. The day was divided into five one-hour rounds and, as there were 73 entries, this meant that models were being launched at the rate of one every 50 seconds throughout the five hours. In the first round there were 38 maximums, including perfect scores by the Danish and Yugoslav teams, and three-out-of-four by Italy, Russia, Hungary, Germany and Poland.

The second round saw 28 competitors with maximums, including 19 with double maxes, among whom was Ed Christenson of the U.S. The Yugoslavs now had three double maximums but the Danes failed to record a single max in the second round and the Russians now took over the lead with three double maximums and a team aggregate slightly exceeding that of the Yugoslavs.

In the third round, the number of fliers with perfect scores dwindled to seven: two Yugoslavs, two Russians, one Italian, one East German and one Hungarian. Ed Christenson was one of the unfortunate ones, but Mason Hoadley clocked a max and Gerry Ritz, flying Jim Daley's model, with which he had had little success in the two previous rounds, now scored the first of his three maxes.

Round four and the Glider Champs began to look like being a "double" for Yugoslavia. The two Russians, Soko-





The maestro. World's leading exponent the International Speed Class, Josef Sladky, Czechslovakia. His 134.22 took first. An excellent time.

Second place, speed, Miroslav Zatocil, right; Frantisek Pastyrik, third, start latter's model. Czechs took top three places. Also a fifth place.

lov and Simonov, failed to record maximums in this round. Only Babic and Hadzovic of Yugoslavia and Zsembery of Hungary now had perfect four flight scores and in the team placings, Yugoslavia led Russia by 41 points. Incidentally, it was in this round that Christenson's model, after making another max, landed in a river. When Ed got there, it was being swept towards a weir, so, like a true enthusiast, he forthwith dived in after it. He didn't even stop to take his shoes off. Actually, the recovery service operated at Mlada Boleslav was pretty good, with motor-cyclists to do the chasing, and radio communication between a Zlin lightplane on spotting duty and ground observers stationed on the airfield boundary.

So the final and decisive round. This time there were 22 maximums but, of the three leaders, only Babic was lucky. Hadzovic clocked 1:57 and Zsembery 1:54. Sokolov, however, obtained 2:45 to hoist him into second place and Simonov clocked a maximum to squeeze into 4th place between Hadzovic and Zsembery. This stout effort by the two Russians was just enough to put their team into first place, overhauling the Yugoslavs with seven points to spare.

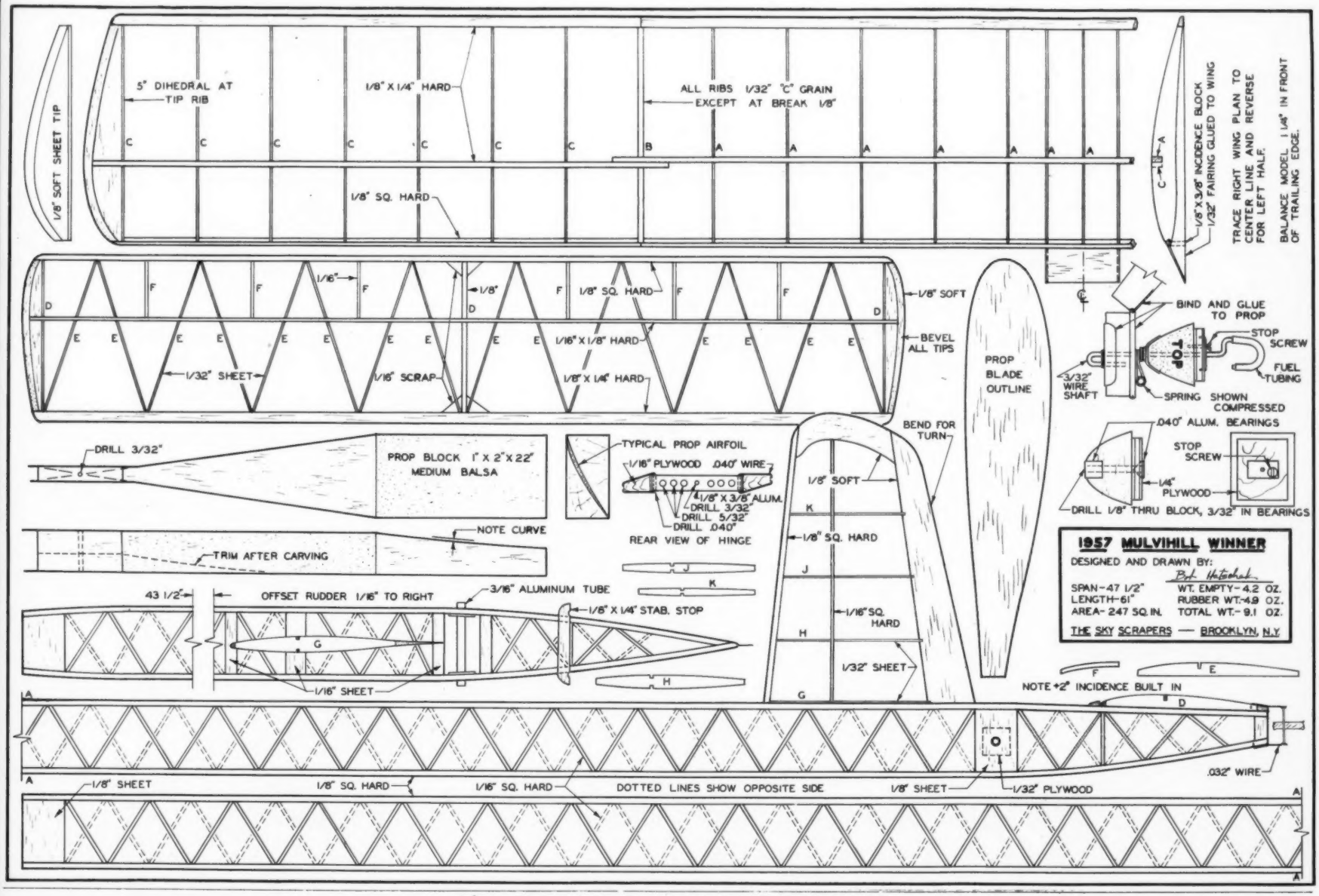
Gradually the remaining positions were sorted out. Jiri Michalek of Czechoslovakia scored a final maximum to emerge in 6th place and Helmut Kunz of Germany also obtained a max and moved into 7th place. John Hannay of Great Britain, after a poor first flight, got his fourth successive max to tie with Hans Hansen of Denmark (1953 winner) in 8th position. Medaglia became the highest placed Italian (10th) and Thomas's Canadian entry, ably proxy-flown by a Czech modeler, moved into 12th spot. Christenson totaled 12:16 to take a well-earned 15th and Hoadley totaled 11:22 for 28th. The average total flight time for the contest was 10:47 per contestant and half the entry exceeded this figure.

In general, there was nothing startling in the way of design development. Nearly all models featured the toothpick type fuselage in one form or another, with exception of the Hungarian entries which had slim, built-up tissue-covered fuselages. The Russians' ships, unlike their models seen in the Wakefield last year, had balsa wing and tail structures and some featured a 1.5 mm. dural spine extending back from the nose through the center-section of the wing. Babic's winner was of orthodox configuration, but with a fairly complex diagonally braced wing structure.

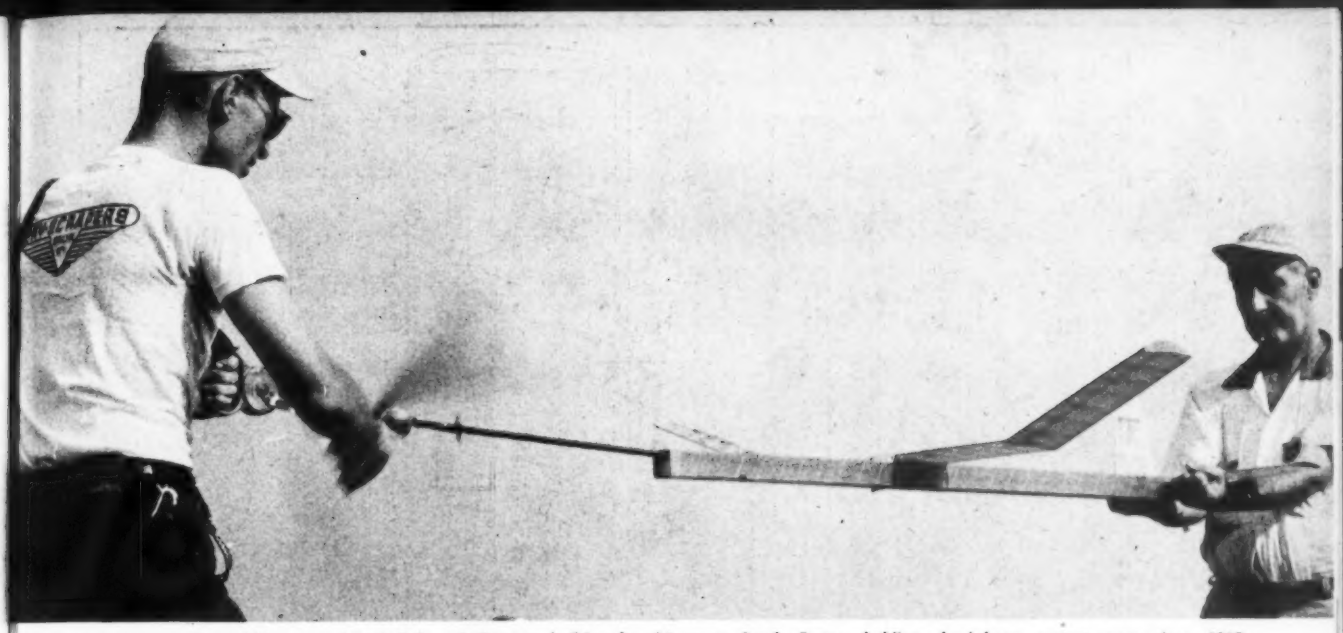
While the A/2 contest had been in progress, processing of the speed jobs had been going on and some of the speed fliers were (*Continued on page* 66)

Russian manager Razorinov with one of team models. Making first essay at World Glider event, Russian team did win convincingly.

Georges Benedek, airfoil fame, lights fuse of Ferenc Zsembery's fifth-place winner, which was top scoring Hungarian model in the Nordic.



FULL SIZE PLANS AVAILABLE. SEE PAGE 56.



Sixty years of modeling experience! Bob, winding, a builder for 21-years; Frank Evans, holding, has been contest goer since 1917.

Plain, simple, rubber job—but good one! It has been flown in 30 mph wind, in the rain.

1957 MULVIHILL Trophy Winner

by BOB HATSCHEK

Designed to do just above 5 minutes, Unlimited Class rubber model is remarkably easy to make for contest job. Many-time winner.

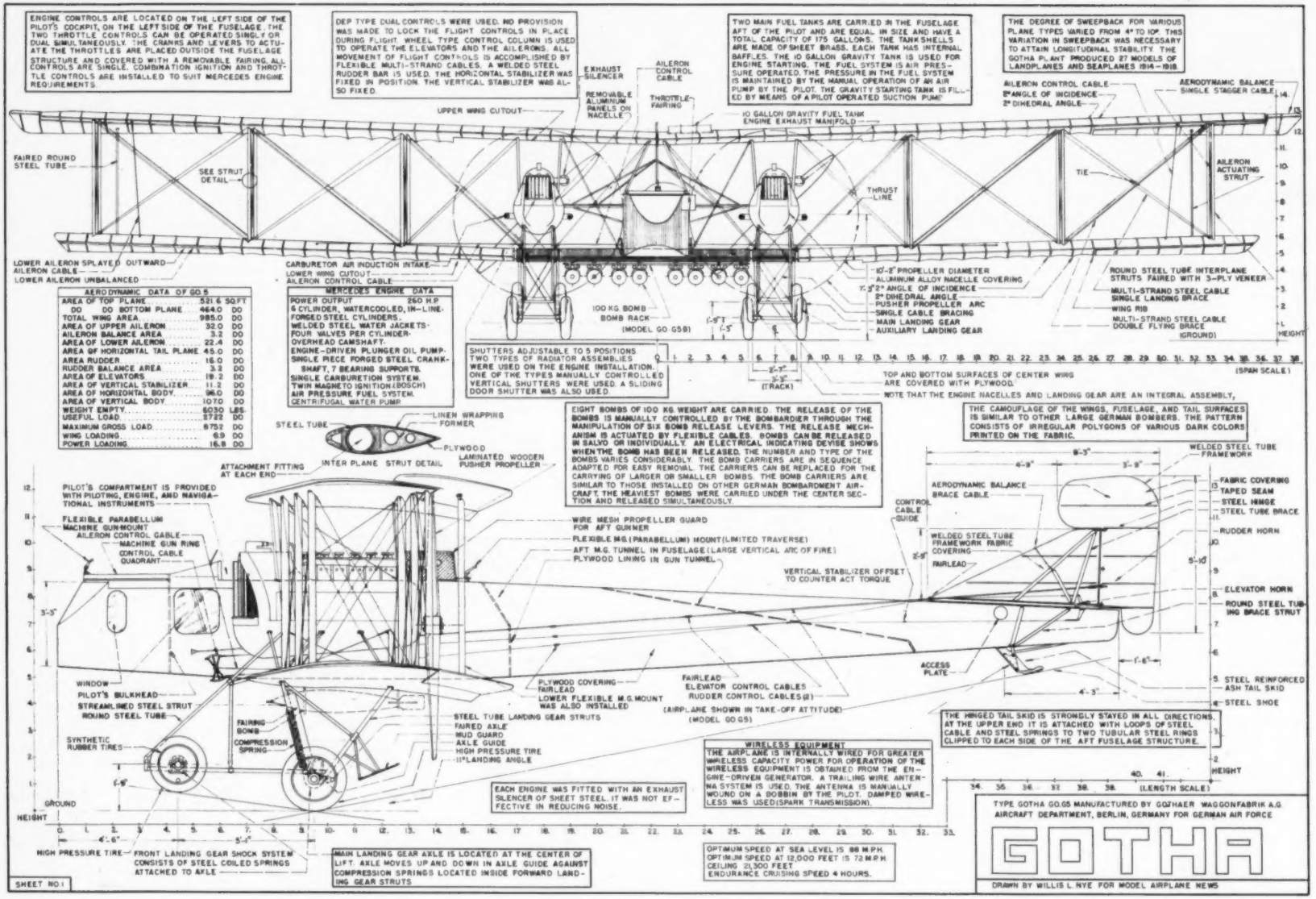
► The 1957 Mulvihill winner is strictly a contest model. It was designed for the simplest and most practical construction, adjustment and flying consistent with performance high enough to win most meets. It is definitely not the ultimate rubber job. But it is a good one.

I feel that an unlimited rubber job can be designed to do dead-air average duration of seven to eight minutes—but building it and flying it would be more trouble than I care to put up with. This model was designed to do just above five minutes in still air—leaving only a slight margin for downdrafts and dead rubber. But it does give a model that is quick to construct and adjust. As a matter of fact, the original had a total of only five test flights before full wind-up for the first official flight at the Nationals. Since this is being written just a week later, I can not make any claims for exact dead air performance—but I feel it will easily do the five minutes.

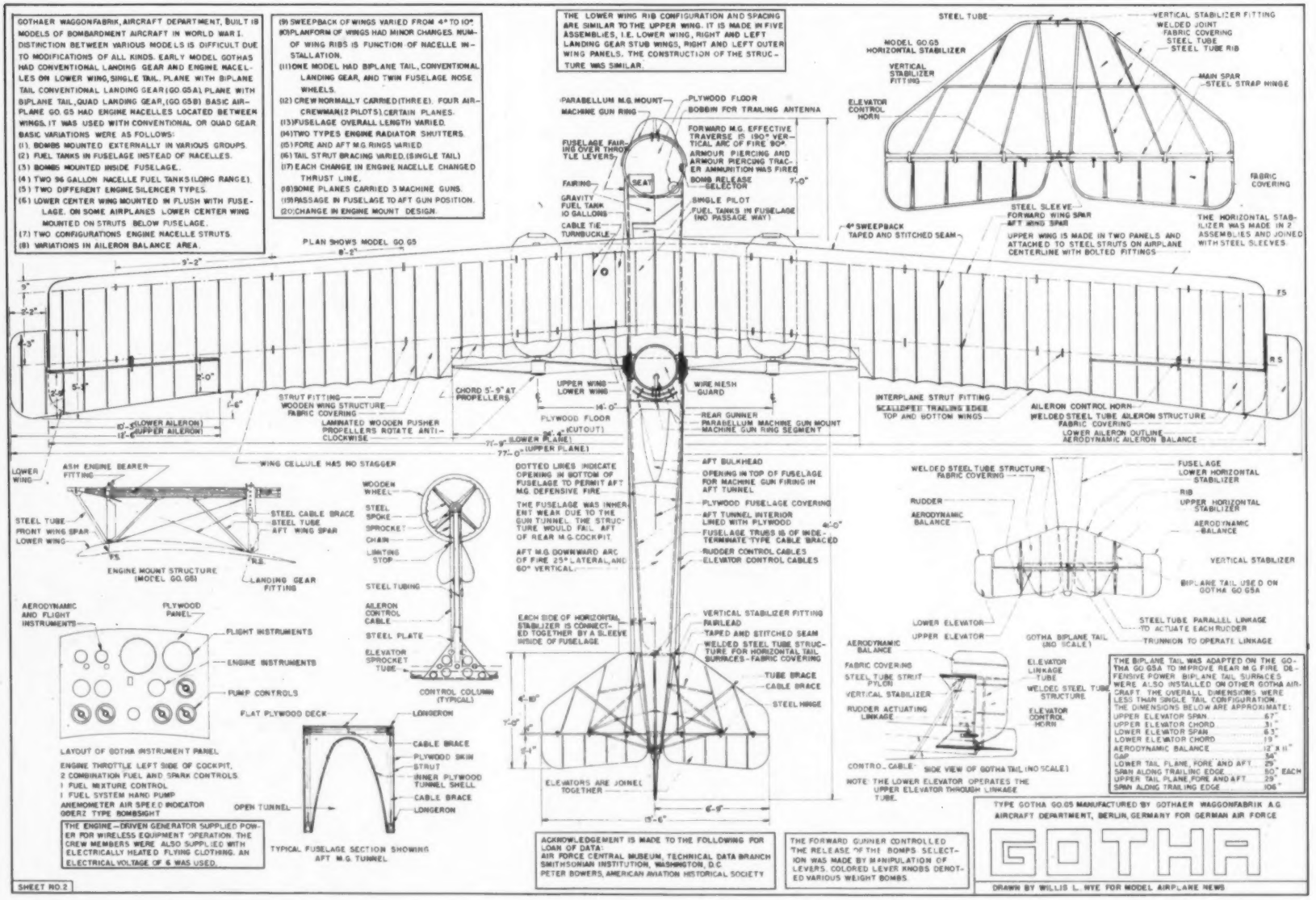
Predecessors of this design have a good all-weather contest record, dating back to the ship with which I won the Open Wakefield event at the '53 Nationals. That design was modified for 1954 Wakefield rules, then reconverted to unlimited rubber in 1956. Contest record in 1956 was three firsts for four meets entered, the model being lost on the second flight at the fourth meet. In 1957, I used an almost identical job (a modified Wakefield originally built in 1954) and fellow Sky Scraper, Bill Dunwoody, used a development of it. These two models were flown in four meets prior to the Nationals, collecting four firsts and three seconds. The only failure was (*Continued on page* 50)

Modeling's oldest, most beautiful trophy, the Mulvihill, right, was first awarded in 1923.

In winning the Nats, ship broke National record—set by Bill Dunwoody, same basic design!



GOTHA! In WW 1 this German bomber was a "secret-weapon" threat to millions. Despite

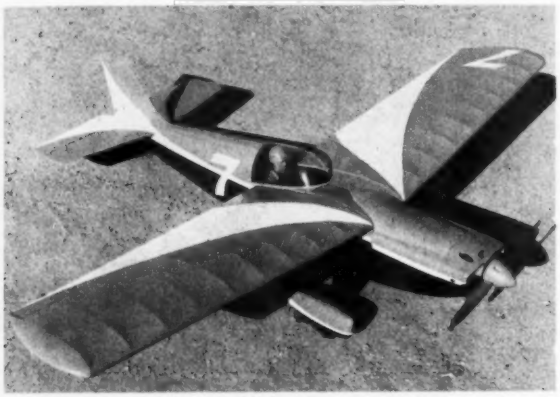


fame, it is still a bit of a mystery. These two plates begin two-part presentation.

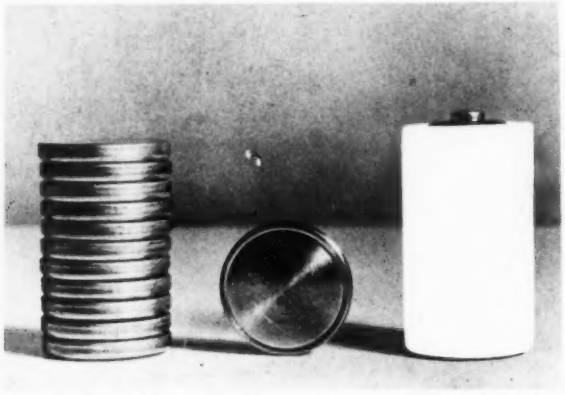
Radio Control News

by E. J. LORENZ

The Indian River RC club, from Down River area of Detroit. Four members flew at the Nats and Walter George, middle row, right, took third in rudder—only. Note club shirts and jackets.



Breezy Senior, designed by Chuck Hollinger, for Babcock, has a 56 in. span, 13-ounce loading, and will take from an .09 to .23.



Rechargeable nickle-cadium, button-cell battery, Gulton Industries, two sizes (½ and ¾ oz.), 250-500 milliampere hours. Available, CG.

► The year of 1957 brought many new items and ideas into the RC field. With this issue of RC News we report the latest new items which we've had the pleasure of examining.

First is the new Breezy Senior, designed by Chuck Hollinger for Babcock Models. This 56" plane is characterized by smooth flights and is capable of top stunt performance. With a 13-ounce per-square-foot wing loading, this job will take engines of from .09 to .23 and control systems have been tested in this ship giving full rudder, elevator, engine and wheel-brake control. If the fly-ability of our Breezy Jr. is any indication of what the Senior will do, this should be an excellent plane for beginner and expert alike.

Also from Babcock Models is the new Pulser and Servo shown in pictures. The servo, suitable for boats and cars, measures 1⅝" x 1⅞" x 2¼", weighs 3¼ ounces and operates on 4½ to 6 volts. This is a proportional servo, which will give any degree of turn desired, and the control will follow the rotation of the ship's wheel, located on the pulser. The pulser uses self-contained batteries and has but two simple connections to any transmitter. Both units contain the reliable Mighty Midget electric motor and we can vouch for the fact that these units worked 'right-out-of-the-box' when we hooked them up according to instructions. Incidentally, this system was an outgrowth of a drone system developed by Babcock Radio Engineering. The #894 Proportional Servo sells for $14.50, and the #895 Proportional Pulser sells for $18.95.

Gulton Industries, the parent company of CG Electronics, has announced their new rechargeable nickle-cadmium, button-cell battery, shown in the picture. Two sizes are available. Model VO.25 is 1⅝" in diameter by 3/16" thick, weighs ½ ounce and has a current rating of 250 milliampere hours, recharged to full capacity, after a complete discharge, in 15 hours. Model VO.5 is 5/16" thick, weighs ¾ ounce and has a rating of 500 milliampere hours. Each cell has a voltage of 1.2 volts and they may be stacked for any desired voltage. For short periods of time, currents up to 15 times the nominal rating of the cell may be drawn. Hermetic sealing and no gassing during charge cycles are features of these cells.

Ace Radio Control of Higginsville, Mo., has a new actuator, a 3½-ounce unit selling for $8.95. It is exceptionally well made and finished. Dual windings draw 60 ma on 3v, 90ma on 4½v and about 120ma on 6 volts. We checked this self-neutralizing actuator and found that it produced the following pulls at the given voltages 3 volts—½ oz, 4½ volts—¾ oz., and 6 volts—1 oz. This looks like an actuator which will be widely used by the pulse boys in '58. Also from Ace, is word that their Commander Audio transmitter will definitely operate the Jernberg Half Tone receiver

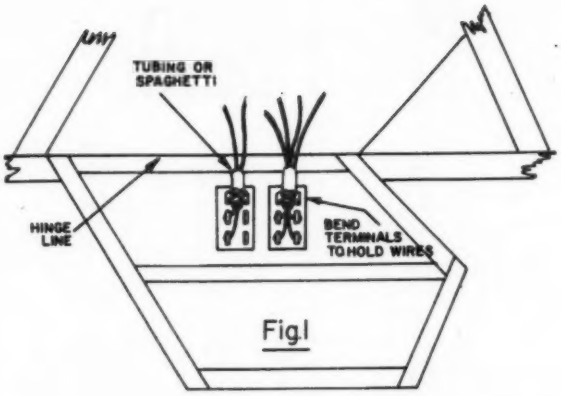


Fig.1

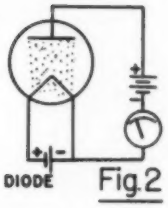


Fig.2

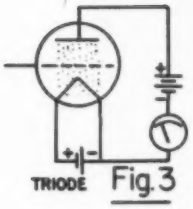


Fig.3

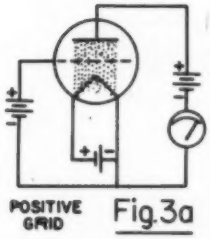


Fig.3a

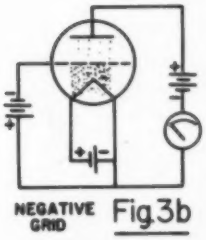
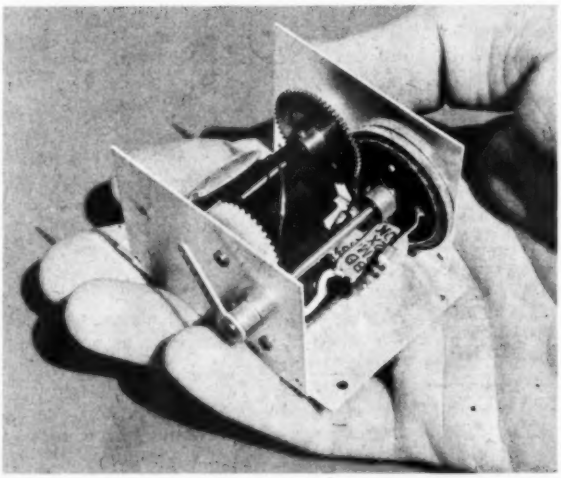
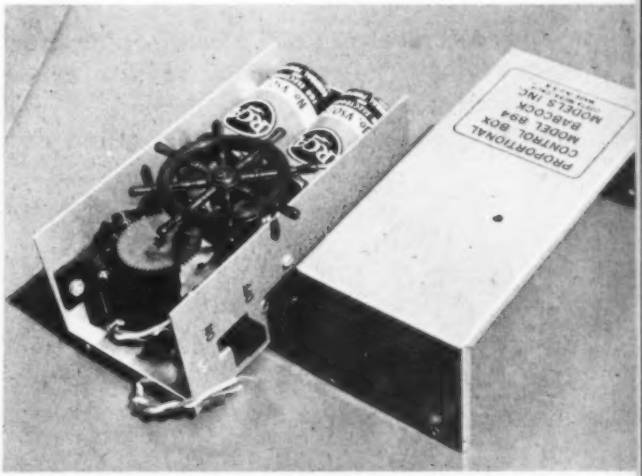


Fig.3b



Matching Babcock servo, suitable for boats or cars, is proportional, giving any degree of turn desired. Also makes use of a Victory motor.



New boat pulser by Babcock has nautical looking wheel, uses Victory motor, and self-containing batteries. Use any transmitter.

given last year in MAN. This transmitter will supply the required 100% modulation. If you are looking for extra springs, coils, etc. for your GEM relay, Ace R/C has them, in addition to a zero centering, 4" scale one milliampere meter, made by Simpson, for $4.95.

Now hear this Harry Geyer, 81 W. Bruceton, Pittsburgh, Pa., has announced that the famous Good Bros. escapement is now again available for $9.50. This was one of the first and best escapements of its time, being followed by the self-neutralizing and compound types. This four-arm escapement is making a comeback for operating engine controls such as the Bramco throttle. Operation is from 2 to 4½ volts, and if the current models are anything like the original units, you can't go wrong.

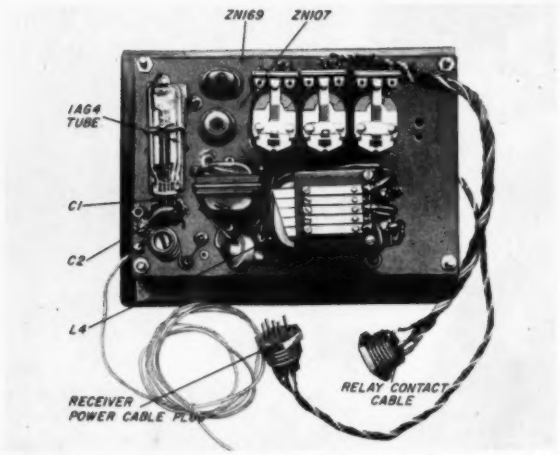
In the same way that the 1AG4 tube was brought to the attention of the RC fan by Essco, we can credit Babcock Models with "discovering" Amperex 6007. This 13ma filament tube is .322" in diameter and 1.417" long, with the wire leads being arranged in-line. It has been checked out in a number of circuits, as a detector tube, and is equal or superior to the 1AG4. Plate voltage is limited to 45 volts and the plate current to .6ma. We have obtained a 2ma plate current but do not recommend it. This is an excellent detector tube and outfits such as Ace Radio Control, Essco, Gyro and Polk's will probably have this tube in stock by (*Continued on page* 58)

Modified Mig 19 and an Ercoupe, V. A. Salvador, Philippines. Mig flies perfectly on ducted-fan Torp .15. Lorenz two-tube receiver.

At year's end builders everywhere contemplate an amazing array of new equipment for 1958 ships! Sputnik not on 27!

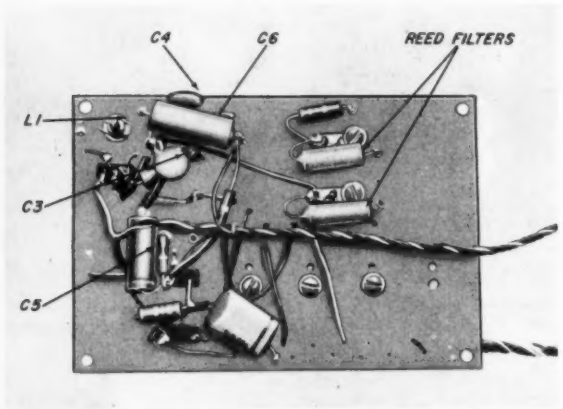
The Pearce RECEIVER

by GEORGE E. PEARCE, JR.

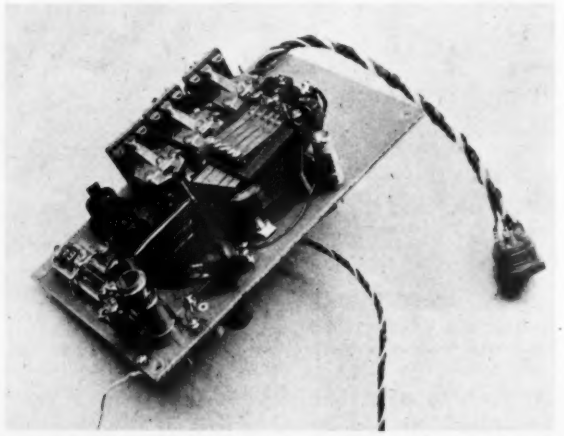


Planned with an "expansion attic," receiver base has room for two additional relays for five-channel operation. Deans reeds.

The reed receiver you've been waiting for! For three to five channels, has low drain, transistor amplification. Proved in the field, it has also been well checked out.



Receiver can be built double-deck for slide mounting, or in a "can." Here, lower base has been removed, showing the "innards."



Perspective view clarifies lay-out. A 1½-volt medium and a 30-volt hearing aid battery will last flying season. Drain, 50 ma.

► With the advent of large scale production of transistors for commercial and military uses, the price of audio units was materially reduced. It seemed practical to consider a composite type multi-channel receiver for model planes consisting of a conventional detector and some type of transistor audio amplifier.

The writer has always considered tuned reeds to be the most practical method of obtaining multi-channel operation so the circuit was designed around a high impedance three-, five-reed unit.

The result of using transistors is (1) space saving, (2) lighter receiver, and (3) smaller and lighter battery complement. One commercial five-channel receiver uses three tubes with a total filament drain of 120 ma and 45 volts B supply. Compare it with this receiver which needs only 50 ma filament drain and 30 volts B+ supply and the battery savings are obvious.

The complete receiver, as a three-channel unit, weighs 6¼ oz. complete with mounting board and sponge rubber. One 30-volt hearing aid battery and medium sixe 1.5 volt cell will give one season of flying (in Syracuse, N. Y., that is).

The photographs of the receiver show there is room to mount two more Gem Relays and that the reed unit has five reeds. However, at present only three channels are being used in a ship with an elevator servo (two channels) and compound escapement for rudder. At some future date this receiver can be expanded into a five channel rig by simply adding two more relays and RC reed filter networks (R6-C8). I, therefore, call this a receiver with an "expansion attic" to allow for future growth. Of course, if one desires to have only three channels, a C. G. three-reed unit will work nicely and with only three relays, a smaller receiver can be built.

The general parts layout shows in the photos and the overall board dimensions are 3¾" x 2¾" x 1/16" linen board. Four 3-56 studs support the receiver by its corners away from another 1/16" phenolic board. This second board is cemented to shock mounting sponge which is in turn cemented to another panel which slides vertically into tracks in the receiver box of a de Bolt Champion kit. If one desires a completely enclosed structure, the main receiver board will fit nicely into a standard 4" x 2" x 2¾" Bud aluminum box.

The receiver is basically a super-regen detector whose output is transformer-coupled into a two-stage transistor audio amplifier. In order to conserve on components, direct coupling of the transistors is employed. To use this method, both types of transistor must be used, i.e., a PNP and NPN. The General Electric transistors listed work nicely

and are both available from large mail order houses such as Allied, Lafayette, etc.

Parts layout is not critical, however, keep the R. F. portion compact with short leads for positive results. If the detector does not give the characteristic rushing noise (indicating proper oscillation), try changing R1 up to 3.9 megs or down to 1.0 megs. I have tried five different 1AG4's, however, and they all operated OK with the circuit shown.

Although parts layout is not critical from an electrical standpoint, you may find some difficulty in laying out all the parts if the alloted space of sub-miniature components are not used. I refer particularly to the electrolytics, 10 and 300 micro henry chokes, transformer T-1 and disc-ceramic capacitors. L4 may be higher than 300 micro henries but not much less. The Walter Ashe Co. of 1125 Pine St., St. Louis, Mo., has a 500 micro henry choke ½" x ¼" dia. listed as No. M-.5 which will work well. If you happen to have a type SO-2 interstage transformer, it will also work well for T-1, but it is slightly larger than the SSO-7 shown. If you use an SO-2, remember to connect the high impedance side to the tube and the low side to the transistors. I found C-4 could be omitted when using an SO-2. For even greater miniaturization a Telex Series "B" transistor interstage transformer may be used for T-1. However, some experimentation with C4 will have to be done to peak the amplifier response when using the Telex transformer. In general C4 would have to be increased to about .02 to .04. The Telex transformer is listed as #8901 in the Walter Ashe catalogue for $2.70.

I found that better reed operation was obtained with the W. S. Deans unit when its coil was supported by a tight fitting aluminum shim between the magnet and receiver base.

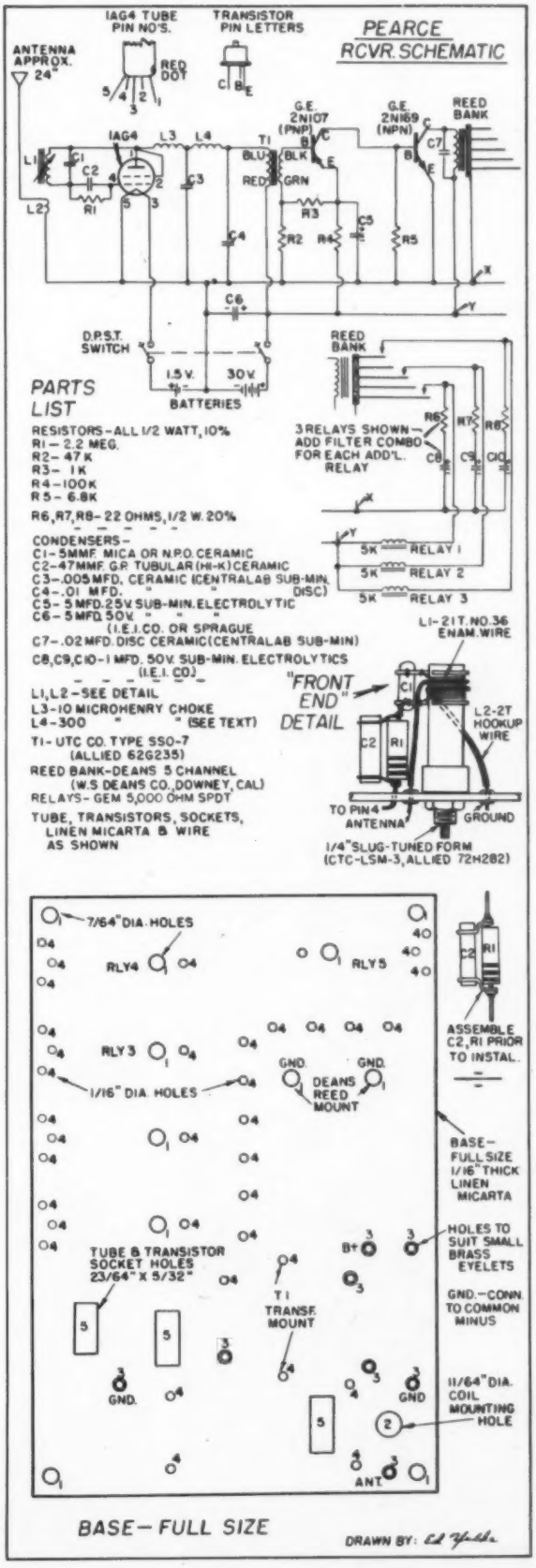
If one wishes, a midget phone jack can be mounted which would allow a pair of phones to be connected across the reed coil (in series with a .01 cap.). The receiver can then be used for monitoring for interference or by tuning into the 11-meter ham band (27.23 mc), just plain amateur listening. On more than one occasion, amateurs from Texas have been picked up with this receiver in Syracuse, N. Y.

Most any type of 100% tone modulated transmitter will operate this receiver although its output should be at least ¾ watt. The better the audio wave shape, the more reliable is the reed vibration and this should be kept in mind when considering a transmitter. Neon tube relaxation audio oscillators are not suitable tone generators for this reed receiver as well as some types of multivibrator saw-tooth tone generators. Best results will be obtained with pure sine wave wave inductance-capacitance tone generators. The Babcock three channel transmitter is of this type and some modulator notes have appeared in various model airplane magazines showing L-C tone generators.

When adjusting the transmitter modulator to each reed frequency, I have found it best to use minimum transmitter power (and with receiver a reasonable distance away since this results in the most accurate reed frequency setting.

A General Electric 2N170 transistor may also work in place of the 2N169, however, your chances are about one-in-five that you may get one that has low gain. Also the voltage rating from collector to emitter of the 2N170 is only six volts and with R5 set at 6. 8K this voltage can be as high as 18 volts. The manufacturer cannot recommend operation with an over-voltage condition; however, if you already have a 2N170, the gamble is not too great. My original receiver is still operating perfectly for the second year with a 2N170.

Drill and cut out the 1/16" thick linen board and secure all eyelets. They must be installed first since you won't have much room for an (*Continued on page* 42)



FOREIGN NOTES

A monthly world-wide round-up of technical developments, designs, significant industrial products.

P. G. F. CHINN

F.A.I.

Last month we reported a British decision to request the return of the Wakefield Trophy to British control on the grounds that, in offering the Trophy for bi-annual competition only, the FAI were failing to fulfill the terms under which the Trophy was donated by the late Viscount Wakefield. However, the agenda for the Annual Meeting of the FAI Models Commission now discloses that the bi-annual system for World Championship events is to be reconsidered. Official reason for these second thoughts is stated to be "lack of expected support from distant countries at the 1957 Championships." In short, there now appears to be an even chance of the Wakefield remaining as the official World Championship event for rubber models.

Great Britain

Mention of trophies brings to mind a report from Britain's SMAE that seems to indicate that British contest fliers have strictly limited interest in sideboard hardware. In SMAE sponsored contests during 1956, nearly half the number of trophies awarded were not collected by their winners. The contests, we might add, were not merely third rate local affairs; most of them are competed for annually on a nationwide basis.

News item from the model industry is of the acquisition of the old-established model engineering firm of Mills Brothers, by the Ayling Industries Group, an organization well-known for its work on specialized precision products, which includes electronic test gear and remote handling equipment for nuclear projects. Mills will enjoy greatly increased research and development facilities by their absorption into this Group and we may expect to see a new Mills engine in due course.

Meanwhile, existing Mills models (the .045 cu. in. "75" and the .08 cu. in. "1.3") will continue in production—and we hope that they will be supplemented, rather than replaced, by any new models. Mills Diesels have a great reputation as ideal beginners' engines. There are certainly no easier handling or more reliable motors made anywhere in Europe.

Chalgrove Airfield, England, and start of what is believed world's first observed flight of an electric airplane. Power, 24-volt motor, at 8 amps. RC ship, 10-minute run, 22 ozs. batteries.

Cochabamba Municipal Stadium and start of demonstration before the Bolivian president. Plane is a K & B Allyn-powered Veco Mustang. Unusual note was finish from aluminum foil.

Norrkoping, Sweden, Norwegian engine maker, J. David-Andersen (left); E. Schobfeldt, speed.

Israel

A year ago in this column we mentioned some of the supply difficulties confronting Israeli modelers and described the "plans library" system operated by the Aero Club of Israel to help them. We then made a suggestion that if any reader with an unwanted plan wished to contribute it to a worthy cause, the Ae.C.I. would be happy to receive it.

Apparently, the response to this appeal was quite remarkable. Naftali Kadmon, secretary of the Model Section of the Ae.C.I., tells us that plans came in by the dozen, plus some modeling materials and even a few motors—the latter from three American modelers who were formerly volunteers with the Israel Air Force. All donors have been thanked personally by Mr. Kadmon, but we should like to add our own thanks to the many who responded so generously—not only from the U.S., but from countries so widely separated as Sweden in the north and Bolivia in the south.

Australia

Tony Farnan, noted Victoria U-control modeler, tied for first place with Bob Hyde in the combat event at the 1957 Victoria State Championships. Interesting to note here is that the Max 29 motor used by Tony was the one with which he won in '56 and, in the hands of somebody else, had also won the same event in '55. Tony claims that this motor shows virtually no wear after three seasons' use and it looks as though other modelers were impressed, because 17, out of a total of 18 combat contestants, had Max 29 motors at this year's championships.

Highlight of the free-flight events was Goeff Pentland's performance in FAI Gas using a .06 cu. in. Allen-Mercury 10 Diesel. His total time was nearly seven minutes better than the next man. A favorite event in Australia is the "power scramble" in which the winner is the man who clocks the greatest total observed flight time within a given period—usually one hour. Number of flights is unlimited and rapid recovery work and a quick-starting motor often counts for more than hot model performance. This year's event was restricted to 45 minutes and in this time, winner Norman Ablethorpe managed to rack up 20:27.

The current popularity of combat, stunt and team-racing events in Australia, as well as the apparent revival in RC, appears to be a fortunate one for O.S. products—or, possibly, the availability of these products may, in some measure, be responsible for current trends. Whichever is responsible for which, the fact remains that the complete range of Japanese O.S. equipment: engines, pulse-jets, glowplugs, props, spinners, receivers, transmitters and escapements, have achieved great popularity in

(*Continued on page* 65)

Perfect answers to better finishing on ev plastic model kit!

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FLAT FINISH
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DOES NOT CHANGE COLORS OR BLOCK DETAIL
• Just removes shine
NEW!

Import Review

by P. G. F. CHINN

Engines look so simple but, in reality, an infinite number of factors encourage endless experimentation and development.

► One of the delights of handling and testing motors from many different countries is the variety they offer. They come in all shapes and sizes: good ones, bad ones, ingenious ones and plain silly ones. Often they tread a well-worn middle path in regards to design and we can almost predict what they are going to perform like by merely looking them over. But we also get plenty that seek to be different and sometimes these are different without any good reason —which can be pretty exasperating when it results in a poor handling motor. Then, as if in reward for our forebearance with the lesser fry, along comes something really brilliant and restores our faith in the model engine industry.

The Enya 29-III (Model 5103)

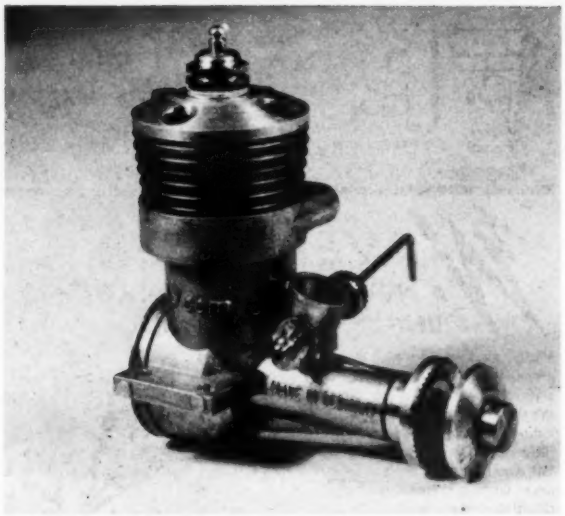
Such a product was the Enya 15 Diesel, which, at one fell swoop, established Japan as a major contender in the contest Diesel field. Disregarding nearly all the accepted European concepts of Diesel design, the Enya 15-D nevertheless showed itself to be more than a match for any quantity-built Diesel .15 produced to date. That designer-manufacturer Saburo Enya's achievement here was no fluke, is now clear to see in the performance of his Series III Enya 29 glow engine.

The 29-III is a re-design of the Enya Typhoon 29 (Model 5002) described in the March 1955 issue of MAN, but a re-design that makes absolutely no concessions to economy by the use of existing components. Every single part of the 29-III is new with the exception of the prop nut and needle-valve.

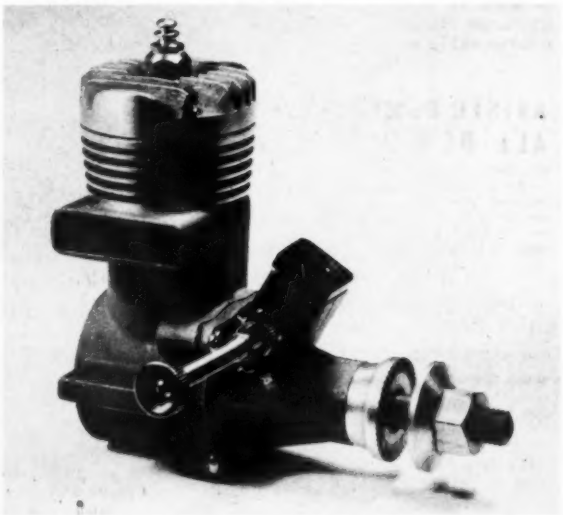
This is design development at its best. It is seldom that modification to any one part does not have repercussions elsewhere and, if extensive re-tooling is to be avoided, this inevitably means compromise and a standard of performance and durability that falls short of that which may otherwise be achieved by a complete re-design.

In the 29-III, the designer has obviously concentrated primarily on the first essential of high-performance: high volumetric efficiency. Starting with the intake, we discover that this has been enlarged to a rectangular section, approximately 13/32-in. x 3/8-in., terminating in a rectangular aperture nearly 1/2-in. long and 3/8-in. wide which registers with a shaft port of the same dimensions. Compared with the normal set-up of a round aperture in the bearing and a rectangular shaft port, this gives a more abrupt valve opening and a longer effective intake period, which is the two-cycle equivalent of the quick-lift racing cam used by hot-rodders to boost performance.

Big, quick opening intakes can only be effective when communicating gas passages are correspondingly large. The earlier 29 already had a sizeable crankshaft passage of 8 mm. (5/16-in.) diameter, but the opportunity has been taken to enlarge this another 0.5 mm., an increase in area of just over 13%. To maintain shaft strength, the crankshaft journal has been increased to 11.5 mm. (.452-in.) diameter and its length extended 3/32-in. to compensate lost bearing area due (*Continued on page 69*)

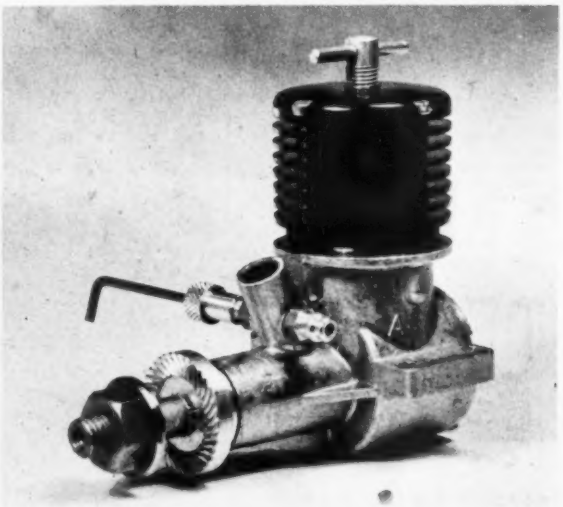


Designed as powerplant for Schuco ready-built models, German Webra Sport Glo is noted for easy starting, despite "juicy" priming.



Is this the best of the foreign .29's? Enya 111 put out exceptionally well on author's tests. It developed .7 bhp at 15,000 rpm. Cools well.

Consistent performance in a rugged engine was goal of Allen-Mercury '25, a .14 displacement Diesel. Compact, simple, aiming low price.



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At last... a completely new dimension in R/C flying, with the New Aristo-Craft "WAVEMASTER" Receiver! Now, you can enjoy thousands of happy, trouble-free operating hours with a truly dependable receiver. The "WAVEMASTER" is chock-full of "most-wanted" features: "Single-Touch" on frequency tuning; 2 (IAG4) hard tubes; "Deep Etch" printed circuit; HI-FI Quality matched components; 4MA current change for absolute, pin-point control at maximum ranges; Customeered Aristo-Transformer, an important feature that completely eliminates sensitivity control; "HI-TORQUE" Super "Q" tuner for locked-in tuning.

You can't buy a better receiver than the "WAVEMASTER"! It's factory built, tested and guaranteed; it comes with dustproof, plastic housing, color coded cable leads and complete instructions.

The "WAVEMASTER" weighs 2 ozs., is 2"x2"x1-1/16", has a Gem 5000 OHM Relay, a battery supply of 45 VB, 1½ VA. Prices complete as described, less batteries.

E-Z to ASSEMBLE KIT
2 Tubes & Relay Included..... 15.95

ARISTO POWER-PACKED ALL-NEW WET CELLS

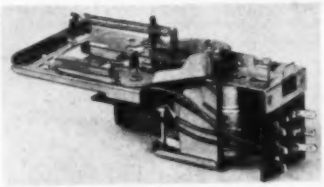
High ampere hour capacity, small physical size, long life. Guaranteed to give trouble-free operation. NOT surplus batteries, they're manufactured from all new, high quality materials. Heavy duty plates, clear plastic case and clearly marked terminals. Each battery comes with charging instructions and are supplied dry for each shipment.

ADD 50¢ SHIPPING CHARGES ON ALL BATTERY PRICES

TYPE 64. Designed to replace the surplace NT6 Wolf Cell. 6 Volts, 4 ampere hour capacity. Measures 2¼" nigh, 3½" wide, 1¾" thick. Replace NT6's with factory fresh reliable power. 4.75

TYPE 26G. 2V., 6 Amp. Hr. Cap. (4½" x 2¼" x 1") $3.75
TYPE 26. 2V., 6 Amp. Hr. Cap. (4½" x 2¼" x 1⅜") $3.00
TYPE 41. 4V., 1.5 Amp. Hr. Cap. (1⅝" x 1⅜" x 1½") $1.65
TYPE 23. 2V., 3 Amp. Hr. Cap. (3⅛" x 2¼" x 1¼") $1.75

ARISTOMATIC COMPOUND ACTUATOR FOR RADIO REMOTE CONTROL



Self-contained electric motor (low drain) plus special integral switching give TWO channel operation from low-cost single channel receivers. You get: Electrical Switching Action—forward • stop • reverse • stop. Mechanical Directional Control — left • neutral • right • neutral. All in one compact unit. Operates on 3-6 Volts; complete with instructions. Aristo-Craft's high quality design and workmanship guaranteed. 10.95

ARISTO MULTI-TESTER

Designed for R C Enthusiasts! Full 2¾" Meter Face. A sturdily built, testing unit covering EVERY R/C need ±2%. This is not a "reworked" surplus test meter. • All M.A. readings to 1000 M.A. • Moving coil type meter • 100 ohms to 10K • All DC v. readings to 200 Volts • Zero adjusting screw • Ohms adjust • Black and Red test leads, prods sup. Hi-impact black plas. case. 16.50

SUPER PRE-FABRICATED GIANT SCALE-MODEL GAS MODEL KITS

These GIANT Kits are chock full of EXTRAS!

They come with full size—"build-on-'em" plans—with many perspective sketches for easy, accurate assembly. All structural parts are of strong plywoods and hardwoods are clearly cut out, identified and precisely finished... ready-to-assemble. Balsa planking is included. Also included: semi-pneumatic wheels, fully formed landing gear, formed bubble canopies, gas tanks, props and hardware. Aluminum cowls and shock absorbing gear supplied where needed. Prices are – less engines.

*P-38 LOCKHEED LIGHTNING (ill.)
58" span, 42" long, 2 class 'B' engines. $29.50

*P-61 NORTHROP BLACK WIDOW.
54" span, 40" long, 2 class 'B' engines. $29.50

*B-26 DOUGLAS INVADER.
57" span, 43" long, 2 class 'B' engines. $29.50

*P 2V-7 NEPTUNE.
52" span, 47" long, 2 class 'B' engines. $27.95

*DOUGLAS SUPER DC-3
61" span, 46" long, 2 class 'B' engines. $27.95

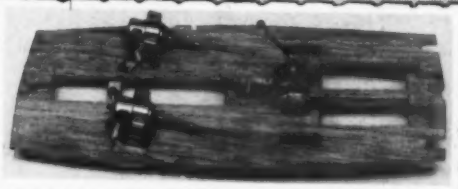
DOUBLE-PER MAG MOTORS

No. 45 DELUXE MOTOR $2.95

A terrific d.c. battery operated motor with amazing power and low battery drain. Fitted with heavy duty replaceable carbon brushes. Enclosed in attractive plastic case, measures 2¼" overall, 2½" wide, 1½" high. Ready-mounted, operates on 1/2 V. to 8 V. DC. Ideal for many uses.

Designed to power the larger R/C boats. It's fully reversible, comes with replaceable carbon brushes, duty-wound armature for max. torque and wet-coil operation. Long-life, electric power plant made of heavy nickel plate. No reduction gear required. max. RPM: 3500. Ready to mount. No. 5 ..... $4.95

No. 01	$ .69	No. 0	$1.00	No. 1	$1.25
No. 15	$1.35	No. 2	$1.50	No. 3	$2.00
No. 4	$2.50				



DUAL-MOTOR POWER UNIT

Specially Designed for Ideal's Wheeler Cruiser

Made by Aristo-Craft, this always dependable Power Unit fits snug as a-bug-in-a-rug into Ideal's popular Wheeler Cruiser. Ready-to-Run, it has Twin Motors, Battery Holders, Switch and Universal Couplings. No Soldering, No Wiring, No Cutting is necessary...this powerful unit is really ready-to-go...all the way! 3.95

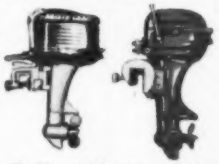
Aristrol MOPA TRANSMITTER

Want output with a wallop? Here, without a doubt, is the most advanced transmitter available... anywhere! Specially designed for Aristo-Craft by Ed Lorenz, the MOPA (Master Oscillator Power Amplifier) has scores of outstanding features all R/C enthusiasts want. You get: Printed circuit chassis; extended range transmission; full battery supply for maximum power output; high tolerance components, quality controlled; specially designed crystal; 3A5 tube; 27¼ frequency and "tuning eye" for fast, accurate checking.

The MOPA comes with complete instructions and license form. Portable (hand-held), it comes in a practical, sturdily constructed and colorful carton with handles for convenient toting.

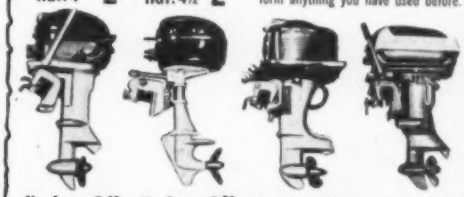
E-Z ASSEMBLY KIT $14.95
READY-TO-USE less Batt. $19.95

ARISTO-CRAFT OUTBOARD MOTORS



Each motor is an authentic model of precision, die-cast and formed metal construction, designed for maximum power and efficiency. You get long-time, trouble-free performance, low current consumption on 3 to 6 V. battery power. Select the size suited to your model, see if it doesn't out perform anything you have used before.

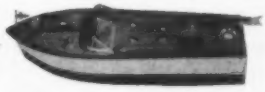
No. 11 HGT. 4" 2.50
No. 9 HGT. 4½" 2.50



No. 4 HGT. 5½" 3.00
No. 3 HGT. 5" 3.50
No. 10 HGT. 5¼" 4.50
No. 19 HGT 5¼" 4.50

12" SPEED BOAT

Has working headlite, double permag motor, spring loaded battery box, nickel-plated fittings, steering wheel, life preserver. Ready-to-run 4.00



1 INCH SQUARE MILLIAMETER

Smallest production light-weight meter. Wgt. app. 3/4". It's small enough to build into your model. Specify the range you desire when ordering. 0 to 1, 0 to 5, 0 to 50 ..... $3.95

MARINE POWER-PACK

A. FOR SMALL BOATS (6" to 12") $1.75
B. FOR LARGER BOATS (12" to 18") $2.00

E-Z ASSEMBLY ARISTO EDU-KITS

MOTOR KIT ..... 35¢
Makes an operating 3-pole battery motor.

CRANE, GEAR ..... 50¢
Makes operating crane, or various drives.

HORN KIT ..... 50¢
For bikes, doors, etc. Variable tone.

BELL KIT ..... 35¢
Many practical uses for home and play.

SEND FOR CATALOGS
NO TRAINS 50¢ • SHIPS 50¢ • RADIO CONTROL 15¢ • VEHICLES 15¢ • 'TT' TRAINS 25¢ • RIVAROSSI HO 25¢ • ALL TRAINS 50¢ • HO TROLLEY-BUS 25¢

Let's Get Started

(*Continued from page* 17)

or fuel proofer. To paint the all wood trainer types, sand smooth all surfaces. The machine cutting is reasonably smooth but some corners, tips, etc., are not fully carved. These take rounding off and sanding.

Sanding sealer should be brushed over the entire surface, allowed to dry, and then sanded with wet-and-dry paper (a fine paper obtainable at the hardware store). Sand until the wood begins to show through at the high spots. Repeat the process twice more, only the last time do not sand down to the wood. A minimum of two coats of colored dope is required for good appearance without blotches. Don't dope or paint on wet or humid days, or in cold rooms—always have ventilation.

The profiles are fun. But comes the time when the pilot wants to stunt. Stunt jobs require more wing area and lower wing loadings in order to maneuver sharply enough to avoid the ground. When learning to fly U-control or when going to any hotter, more sensitive plane, the tyro should space the lines close together at the handle—if adjustable, and use minimum control movement throughout. This means using the horn hole farthest from the elevator surface, and the hole nearest the bellcrank pivot—if the crank has more than one hole. As he grows familiar with the ship, movements, and response, can be stepped up.

Over the years, our mob built a succession of Ring Masters. (There are similar kits of other makes in the hobby shop). The profile construction was as simple as the familiar trainer profile. But now the wing was built up, paper covered. Most of our Ring Masters ended up with silk-covered wings—don't ask why, they just did, and were stronger and better looking for it. The American Junior Firecat, a more deluxe kit, made an excellent all-out stunter later on. When the new U-control flier graduates to stunt, he should avoid the more realistic stunt types with full fuselage construction, instead of the profile. These should be left to later—when he can fly inverted without cracking up and begins to think of contests. Those ships take more time and effort to build and it is a shame to wipe them out when learning to stunt. After knocking around a Ring Master for a few weeks, more nifty types, like the Nobler and Smoothie were built, cleverly painted, and flown with minimum risk.

That the industry doesn't think of everything, often is proved by modelers who try something new and different. Our crowd discovered that truly unbreakable, realistic free flight models could be made out of the smaller radio job kits. The Sterling Mombo, ranks second only to a brick for structural strength and it is a good flier. Without the weight of radio and batteries, it climbs and flies prettily on even an .065. An .09 will take it—or a Live Wire Trainer, Esquire, high enough for a healthy chase. Such ships will never wear out, won't break, and make possible free-flight sport without driving 60 miles into the country. A small tank or reliable fuel-shut-off timer will keep the ship on the field. Or put a 19 on the thing, a bellcrank and flippers, with the balance point moved forward, and you have a wear forever U-control model. A slug of lead in the nose to pull the CG as far forward as the front line, or even nearer to the leading edge, will kill ballooning tendencies when flown fast on lines. Downthrust helps, these wild eyed improvisors found out.

Yes, anybody can make and fly model airplanes—provided they pick out sensible projects to begin with and work up gradually from there with kits that introduce successively additional tricks in construction and flying technique. After that, the sky is the limit.

(To be Continued)

The Lieutenant

(*Continued from page* 18)

difficulties). Next, cement the motor mounts on the fuselage sides and slip the sides on the wing adding the formers. Finish the horizontal stabilizer and hinge after inserting the Veco control horn; place the stabilizer on the fuselage, connect the pushrod and cement the section. Check controls for free operation as this is very important (30 degrees up and down maximum).

Insert the tank in position, cement the rudder on, and then plank the top of the fuselage. Add the plywood base for the landing gear, tailwheel, and then place the bottom planking between the fuselage sides. Do not eliminate making a generous fillet where the wing and the stabilizer join the fuselage. Make the wheel-pants, finish the canopy and you are almost in business.

The original Lieutenant was covered with silk and given seven coats of Aero Gloss clear dope. The color scheme was a black fuselage, red wings and a silver pin stripe separating the two colors. The airplane should balance at the front lead-out wire (note that the wires are slanted to keep the lines taut). No wing-tip weight or off-set rudder was used, but the engine has three degrees of right thrust. A 2" Froom spinner was used, as I do not recommend the use of a plastic spinner.

The model was designed for a Fox 35 and flown on 65-foot lines; if a different engine is used, check the nose section for the increased shaft length. If you think flaps are necessary for a model of this size, try it and see if any model you have flown will pull a better triangle!

The only thing I had to sweat out on

(*Continued on page* 42)

this model was the fact that after I made the first flight, my room mates threatened to dunk me in the water barrel (an Air Force custom: you get dunked after you solo). Since you do not have to worry about this, you should have no trouble with this design.

Bill of Materials

(Balsa unless otherwise stated)

8-1/16" x 2" x 36"—wing leading and trailing edge and planking; 2¾" x ½" x 36"—main wing spar; 3-1/16" x 3" x 36"—wing ribs, wing tips and rudder; 2¾" x ¼" x 36"—leading edge; 4-3/16" x 3/16" x 36"—wing stringers; 2¾" x 3" 36"—fuselage sides and formers; 6-1/16" x ¾" x 36"—wing cap strips; 4-3/32" x 1" x 36"—fuselage planking; 1¾/ x ½" x 12"—(hardwood) control and engine mounts; 2-3/32" x 3" x 36"—bottom fuselage planking and formers; 1¾" x ¾" x 36"—fuselage strip; 1¾" x 3" x 36"—stabilizer and elevator; 1½" x 2" x 12"—wheel pants.

1/16" steel wire; 3/32" steel wire; .064" aluminum; 1/16", ¾" plywood; 3" bell-crank; Veco control horn; plastic for canopy; 2" Froom spinner; 3½ oz. Froom gas tank; 2" diameter wheels; ¾" diameter wheel; silk; Fox .35, or similar engine; dopes and silk.

Pearce Receiver

(*Continued from page* 33)

eyelet tool after most of the parts are in place. As a general rule remember not to solder in eyelets until all the wires are installed in that particular eyelet.

Slip terminals of coil form together so that there is 3/16" space between inside edges of terminals, 17/32" from board surface up to bottom terminal (See dwg.). Wind 21 turns of #36 enamel or formex insulated wire and solder ends to terminals on coil form. Make up L1-C1 combination by soldering C1 right to terminals on L1 coil form. Make up R1-C2 combination by soldering tubular capacitor up close to resistor R1 leaving long leads on R1 as shown on dwg. Due to this close soldering to the resistor only as little heat as necessary should be used. Also, it is advisable not to use an IRC ¼ watt resistor for R1; use an Allen Bradley, Ohmite, or Stackpole ½ watt.

Cement in tube and transistor sockets. Mount T1 in the ¾" spaced holes near the tube socket (not in holes labeled GND and B+ on base layout) by using #18 or #20 solid copper wire. Twist together under board to tighten and solder. Be sure that the black and green leads face the transistor sockets. You should not yet mount the reed bank or relays.

Mount the coil form, facing the terminals in line with the #4 hole to the left of the tube socket. Slip R-1-C2 combination down through this #4 hole soldering one end to pin #4 of tube socket and other end to lower coil terminal as shown in Fig. B. Thread short piece of small diameter solid or stranded plastic insulated wire around L1 for two turns and measure the proper length to eyelets labeled ANT. and GND. to the lower right and left of coil mounting hole (see base layout). Remove wire, strip and tin ends, reinstall and solder in firmly. Be sure there is no "flop" in this link coil. Try and keep L2 toward lower end (R1-C2 end) of coil although this is not critical. Run short wire from top terminal of L1 down through other #4 hole to right of tube socket and crimp (but do not solder) to terminal #1

of tube socket. L1-C1, L2 and R1-C2 are now installed on top side of chassis board.

L4 is also mounted on top side using the two eyelet holes (#3) closest to B+ eyelet.

The remaining components are now soldered in using the photographs as a guide to placement. The location of parts is not critical, but a little time spent in planning will result in a neat arrangement. Remember when placing parts, to allow room for the tube clamping wire that goes around tube and under board through the two #4 holes spaced 15/32".

Now the reed bank can be mounted; first soldering C7 to reed winding terminals and tucking into space formed by aluminum frame. Put a solder lug under each mounting bolt on underside of chassis. It is still not necessary to mount relays or filter networks R6--C8, R7-C9 etc.

After the wiring is completed, check to be sure the transistors are in the correct sockets (and correctly in the socket) for you cannot reverse them. Now connect a pair of phones, in series with a .01 cap, across the winding of the reed bank and turn it on. A loud rushing noise should be heard with no transmitted signal. When tuned to your operating transmitter a clear note should be heard. The W. S. Deans reed unit covers the audio range of about 280 to 390 cycles. Operating current values are: Plate of 1AG4—.25ma, reed winding —2 to 4 ma depending on transistor, relay approximately—0 to 2-2.5 ma. After determining that the reeds respond loud and clear to the transmitted signal, the relays can be mounted. Be sure to adjust the Gem (or other) relays to pull in at 1.4 ma. If 7.5K relays are available, they will work better than 5K units since only slightly less relay current will flow in this type of circuit regardless of the relay resistance (in the 5K to 7.5K range). This is believed to be due to the fact that the relay inductance is the primary current determining factor and the rise time of current in a 7.5K relay is not materially slower than that of a 5K relay within period of the intermittent reed contact.

It is helpful to connect each relay frame to one of the unused terminals on the Gem relay terminal board by a short jumper wire. It is then more convenient when wiring the escapement and/or motor servo's. The row of #4 holes near the center of the board are for the interconnecting wires between reeds and relays. R6-C8, R7-C9 etc., are connected in series between reed terminals and grounding lugs on under side of chassis. Put either capacitor or resistor lead through a #4 hole next to reed and solder other end to reed terminal.

Although not shown on schematic, relay contact arc suppression networks should be used. There is sufficient room on under side of chassis to mount these parts. For suppressing an escapement arc, a 47 ohm resistor in series with a .02 to .05 mf capacitor across the relay contacts is recommended. To suppress a motor servo arc, the writer uses a 47-ohm resistor in series with a .1 mf capacitor soldered directly across the motor terminals. In addition, the usual .01 mf ceramic capacitor across the motor terminals.

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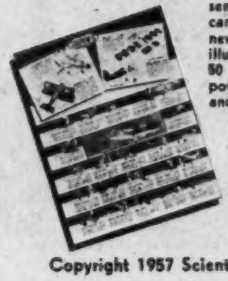

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STUNT MASTER $1.69
SPAN: 18" For .035 to .099 Eng.
Very popular ½A stunt plane. Highly colorful . . . terrific action. Super prefabricated kit.

P-40 Flying Tiger $1.95
SPAN: 18" For .039 to .074 Eng.
Our popular U-Control model of this Curtiss World War II fighter. Prefabbed w/carved fuselage.

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SPAN: 18" For .039 to .074 Eng.
A real "beaut" of a model. It's authentic scale . . . for U-Control flying. Prefab. Carved fuselage.

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SPAN: 18" For .039 to .074 Eng.
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Scale fly-it-yourself model. A real U-Control thriller. Super prefab with carved fuselage.

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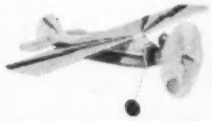
Authentic scale model of the USAF AT6 Trainer. A top-notch "fly it yourself" model. All prefabbed.



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Terrific fly-it-yourself scale model . . . with a gull wing. All prefabbed with carved fuselage.

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SPAN: 18" For .020 to .074 Eng.
Extremely popular U-Control trainer at a big bargain price! It's profile and all prefabbed.

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Scale flying model of famous trophy race winner. U-Control. Prefabbed. Carved fuselage. A real thriller!

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All About Pulse Jets

(*Continued from page 22*)

here—at least as far as reducing engine length is concerned.

It has been established that there is an optimum ratio of combustion tube length to maximum diameter, for any given size of pulse-jet. It has also been noticed that this ratio increases as diameter decreases. In other words, the smaller the engine is made, the greater will be its length relative to its diameter. Hence the short and fat proportions of some full-scale pulse-jets as compared with the slenderness of typical model jets.

The result of these rules, when applied to model pulse-jets, has been to show that reducing the combustion tube area by as much as 50%, still requires an overall length in the region of 85% of the length of a Dyna-Jet.

A practical example of a small pulse-jet is seen in Kaneko's recently introduced Tiger-Jet M-1, now being imported. This neat little unit weighs only a little over 7 oz. The ten-port valve head is virtually a miniaturized version of the standard L-1 unit. Intake throat is 11/16 in. dia., and valve ports are just under ¼ in. dia. Combustion tube is welded up from two half shells of stainless steel in the usual way and is fitted with a specially made ¾ in. plug.

One other Japanese built jet, also available in the U.S. must be mentioned. This is the O.S. Type II built by the Ogawa Model Mfg. Co., of Osaka who, unlike the other pulse-jet makers, are also well-known as manufacturers of model reciprocating engines. The O.S. Type II again follows the Dyna-Jet as regards layout and proportions but exhibits a number of small design changes. The first of these is in the construction of the valve head, which is in two diecast and machined parts, the venturi tube and the valve-seat. These fit together closely and accurately to form the ten intake passages and are secured with four Phillips head screws. The valve is fitted in the normal way but is made in two halves, each with five petals. The Type II O.S. is fitted with a spun aluminum cowl, similar to the Tiger-Jets, except that this is screwed onto a thread on the front of the intake.

At this writing, there is only one other American made pulse-jet being manufactured: the M.E.W. 307. This unit has been on the market for a number of years, originally appearing with a fabricated valve head welded up from aluminum tube and plate. Later it was redesigned with a rugged cast head and, as from this year, has been fitted with a spark plug, for those who prefer high tension electric ignition for starting. Previously, the M.E.W. has had to be started by external flame ignition applied at the tailpipe.

The M.E.W. has the distinction of being by far the cheapest of any pulse-jet, domestic or imported, ever offered to the American model builder. This, to some extent, is made possible by the simplified construction of the engine, especially the valve head. The head is three in. diameter and has a 1-1/16 in. diameter intake, leading into eight rectangular valve ports approximately 9/16 in. x 9/32 in. These are arranged into upper and lower banks of four and each pair is covered by a .007 in. spring-steel valve, 2 in. long and ¾ in. wide. The four valves are clamped at the centers by a curved rectangular valve retainer of aluminum alloy and four screws.

The valve head is pressed into the combustion tube and held by a "Wraplock" clip. When you have occasion to remove

the M.E.W. valve head (as for valve replacement) the best way, after removing the clip, is to gently knock it out with the aid of a 1¼ in. diameter broomstick up through the tailpipe. Be sure, however, to chamfer off the end of the stick, as shown in our photograph, so that it can bear only on the two center valve screws and cannot distort the valve retainer.

The M.E.W. 307 has a simple one-piece jet with a strut attaching it to the lip of the venturi. No air line connection is provided: one simply plays the starting air direct into the intake. This starting technique may need a little practice, but especially when combined with flame ignition, also a plentiful supply of air, it has the advantage of a fuss-free and rapid take-off (always desirable with a jet) since there is nothing to disconnect from the engine.

There is no doubt that up to the present time, the U.S. and Japan have led the world in the manufacture of model pulse-jets. Two pulse-jets were manufactured in Britain in 1948 and 1949. The first of these, the Jaggers Juggernaut was closely modeled on the Dyna-Jet but was less successful and disappeared from the market within a year or so. The second was the Decojet, an engine of slightly more original design, but which eventually suffered a similar fate. Pulse-jet engine models have never received more than lukewarm support from British modelers and the few specialists who have built this type of model, have mostly preferred to employ the well-proven Dyna-Jet. In West Germany in 1952-53, there appeared the short-lived BWM.RT.2000 with glowplug ignition and an unsubstantiated claim of 2-kg. (4.4 lbs.) static thrust. Another

make is now available but reports on it have not been entirely favorable.

In Russia and the Soviet satellite countries, many model pulse-jets have been built—though seldom on a production basis. In Czechoslovakia, for example, various copies of the Dyna-Jet, slightly modified to assist "home-built" construction have appeared. A typical example here is the Brauner jet, the arrangement and dimensions of all the significant parts of which, are identical with those of the Dyna-Jet. It has a simplified head to avoid the complication of machining the ports, while the tailpipe is rolled in three parts with a straight conical transition section between the combustion chamber and tailpipe.

The most successful Russian pulse-jets are nearly all bigger and of lower frequency than the Dyna-Jet. Thrust figures as high at 2½-kg. (5½ lbs.) have been claimed for the largest types, which, in view of the fact that these engines have a 60% greater combustion tube area, is quite possible. The present FAI world record of 170.8 mph is held by Ivan Ivannikov with a jet of this type.

In East Germany, there is now a pulse-jet available commercially, the Victoria MD.1, made by a typewriter firm. Eyewitnesses say that it performs quite well. Basically, it is similar to the Dyna-Jet except for having 12 ports, instead of ten, and a cowl over the head which extends forward into a bullet-shaped gas tank. Nearly all the pulse-jets from the Communist countries, incidentally, are lighter than those of Western origin. Some saving in weight is usually made in the construction of the valve head, but as more than half the weight of any model pulse-jet is in the steel combustion tube, it is evident that a thinner material is used here.

Pulse-jets are not for beginners. If you have not previously heard a Dyna-Jet in action, you will probably be taken aback by the shattering noise it makes and possibly by the extremely high temperature of the combustion tube. It is not the purpose of this article to repeat information already given out in makers' literature but we make no excuse for re-emphasizing the safety angle.

A pulse-jet, properly handled, is just as safe as a piston engine and perhaps more so. It does not compress its fuel charge and cannot, therefore, explode, but carelessly treated, it can cause burns and, carelessly flown in a model, could result in damage to persons or property. Fortunately, such occurrences are rare.

Don't mount your jet on a flimsy airplane that may tear loose. Make sure that the control linkage and control-lines, also the mounting of the engine itself, are strong and secure. If there should be any onlookers, make sure of proper spectator-control.

For the good of your engine and model, don't bench-run or ground-run needlessly. With some foreign engines, the tailpipe may distort if the engine is ground-run for more than 15 seconds, due to the absence of a cooling airstream. Practice your starting drill with your helpers so that you can get your model into the air within a few seconds of starting.

Jet enthusiasts have their own pet notions in regard to starting. Some prefer a compressed air bottle, others swear by the common hand tire pump (foot pumps not favored) or a portable garden sprav unit that can be pumped up to about 50 p.s.i. Ignition source is, most popularlv, a Model T Ford trembler coil and six-volt battery. The O.S. company make a special

(*Continued on page 50*)

vibrator coil starter unit of this type for six-eight volts which is sold in the U.S. by World Engines at $7.95. Another scheme we have used quite successfully is a hand-cranked magneto suitably geared up so as to provide rapid sparking. In the absence of such equipment, one sparkplug lead, suitably extended, from an automobile engine can be used. (If respect for your car makes you hesitate over this, make sure the engine is hot before disconnecting the plug lead). In Europe, flame ignition is quite frequently employed, usually in the form of a kerosene blowlamp applied across the tailpipe nozzle.

Servicing of your pulse-jet is virtually confined to the occasional replacement of the reed valves. In the course of time the edges of the valve petals become burnt and distorted and make starting difficult. Replace immediately, otherwise the valve head face may become damaged. If this surface is pitted, it should be cut down, preferably with grinding paste or powder and oil on a sheet of glass as shown in the photograph.

As regards improving performance, there is not much you can do beyond ensuring that the intake ports are smoothly polished and that the valves are seating properly. Try alternative jets where recommended. Do not tamper with the combustion tube.

As we have seen, model pulse-jets are largely of standardized design. They may very well remain so. If further improved, however, the most profitable line of development may well be in valve head design. All the most marked performance advances in full-scale pulse-jets have been due to improvements in induction. It is conceivable that a larger entry and redesigned valves, combined with pressurized fuel injection could offer some extra power.

Mulvihill Winner

(*Continued from page 27*)

one meet at which three flights were not completed.

It is interesting to note that while Bill is an accomplished glider and gas flier, this was his first serious attempt at a real contest rubber job. In trying to stir up more rubber flying interest among members of the Sky Scrapers, I had written up some design notes aimed at a fairly simple rubber job that would do four to 4½ minutes and still be easy enough to build and fly for tyro rubber fliers. When Bill built a ship to these notes and proceeded to beat my old ship at two of the four meets we entered, I just had to design and build a new one—this one.

In all fairness to Bill, I must add that he had two good flights at the Nats, but his rubber job was lost on the second one. We both have the poison ivy to prove that we searched for it!

Construction of this model is basically simple but there are a few points where care should be taken. First is the selection of wood. All strips should be quite hard. All ribs should be medium to medium hard quarter-grain stock. Don't increase any sizes as you will merely add weight to a model that's plenty strong enough. The original, by the way, weighs 4.2 ounces without rubber and carries 4.9 ounces of rubber.

On the body, make good splices in the longerons, putting one or two coats of cement on the joints before joining. Be sure to build the body straight. A few temporary cross pieces will help in joining the sides. And be careful not to force any diagonals into place as this will twist the body.

(*Continued on page 52*)

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Wing and tail are straightforward but it is important that they be perfectly true and unwarped. Note that the incidence block and fairing are cemented to the wing. To attach the wing, just wrap rubber around the body.

If one item must be singled out as the most important in a rubber job's performance, that would be the propeller assembly. Carving is not difficult, but great care must be taken. The 1" x 2" x 22" block should be medium balsa, with straight grain, and without variations in hardness.

It is best to drill the 3/32" shaft hole in a drill press and cut the blank to shape on a band saw. If you don't have or can't borrow this equipment, just be extra careful. Carve the back surface of both blades so a straight edge will lie corner to corner on the blank—this will give perfect helical pitch—then carve and sand the under camber. Next, carve and sand the convex faces of the blades to airfoil shape. Using a template, trim blade outlines to shape and sand and balance the prop.

At this point, I attach the hinge. The hinge itself is made of a ⅛" x ⅜" x 2½" aluminum bar drilled 3/32" at the center for the shaft and .040" at the ends for .040" hinge wires. I also drilled several 5/32" lightening holes in the bar. Hinge holes should be drilled with great care in a drill press and they must be perfectly parallel to one another and at right angles to the length of the bar. It is not necessary to angle the hinges on a small cross section body like this one.

It may seem paradoxical, but it is actually easier to drill hard aluminum than soft. It you can get it, I'd suggest 2024-T6 aluminum alloy (24S-¾ hard). I couldn't get it so I used a soft alloy. Be careful not to break your .040" drill. Use oil and back the drill out frequently. Check for parallelism by inserting two lengths of straight .040" wire in the hinge holes and sighting.

Insert hinge wires, bend them to shape, and bind and cement the small 1/16" plywood plates in place. Cement the aluminum front plate to the propeller, then slip a length of 3/32" wire through both prop and hinge and bind and cement the whole works together. When it is absolutely dry, cut through the prop hub in line with the hinge pins. Cut away any cement or balsa that may be binding the hinge and work it back and forth until it folds freely. There should bé no slop at all in this hinge.

Put two or three coats of clear dope on the prop, sanding and checking balance between coats. Then cover the blades with Jap tissue and dope another two or three coats—again with sanding and balancing.

Make the nose block as shown on the plans, being very careful to line up and firmly cement the aluminum bearing strips to front and rear. For a thrust bearing, I used a European 2 millimeter outside-diameter, ball bearing from New England Wakefield Supply (33 Exchange St., Rockland, Mass.). I drilled this out for 3/32" wire. American 1/16" ID ball bearings can also be modified for 3/32" wire, but it's much more trouble. Bend the .040" safety-pin type tensioner spring and make sure it won't bind on the shaft. I find this type much preferable to coil springs.

Now for the only part that can even be called difficult—bending the 3/32" shaft—and this can be conquered by determination and the proper tools. First bend the rubber hook either with fairly large round nose pliers or around a 5/16" or ⅜" metal rod clamped in a vise. To make the two right angle bends for the tensioner catch, I use a bending jig consisting of two short pieces of 3/32" wire set in an aluminum block with about ¼" between. This, of course, is clamped in a vise.

Make sure the hook is true and that it is centered on a line with the shaft. After all, what good is a balanced prop if the rubber is off center? Now slip the nose block, ball bearing, tensioner spring and propeller on the shaft.

Take a deep breath and be careful from here on because a slip now might destroy your prop. At the proper distance in front of the hub, bend the wire (which should still be a long piece) to about a right angle with heavy pliers. Clamp a piece of ¼" wire or nail in the vise and bend the shaft further around that. You should get it back to a 60° angle or so. Now cut off the end to the proper length with a small file, insert the ¼" wire into the front hook and squeeze with heavy pliers until the short end is parallel to the shaft.

Wrap a few turns of copper wire (about No. 24) around the winding loop and solder. Compress the tensioner spring and insert end of winding loop into hub. Slip some medium size plastic fuel tubing on the rubber hook—a drop of rubber lube is helpful here—and screw the tensioner stop into the plywood on the rear face of the nose block in a position which will give the flattest fold of the prop blades. Mark "TOP" on the nose block to avoid mistakes when flying.

Before covering the model, put one or two coats of dope on every part of the frame that touches the tissue—Jap tissue is used throughout. And dope the covering to everything that touches it. This includes the tops of wing ribs and every diagonal in the body! Three coats of thinned dope are adequate. I prefer unplasticized dope (no castor oil added) because I like to fly early in the morning to avoid downdrafts and hot sun on the rubber and plasticized covering will sag in the dampness.

Make up motors 52" long of either 16

(*Continued on page* 54)

strands of ¼" Pierlli or 20 strands of ¼" T-56. I use T-56 for testing, Pirelli for competition. Motors should be well lubricated and very carefully broken in before use and they should take about 1,040 turns. I used just under 1,000 on all flights at the Nationals.

Best thing about this model is the ease of adjustment. Make sure wing and stabilizer angles are just as shown on the plan, and that the rudder is cemented on with a 1/16" offset for a gentle right glide turn. For trimming the turn, warp the wide trailing edge. Hand glide the model, shifting the wing back and forth until you're satisfied. Then try about 125 turns in the motor, checking both climb and glide. If all is well, try 250 turns, then 500, then go all the way. If you change any adjustment, try another flight at the same power before proceeding. My model required slight left thrust (about 1/64") to get a medium right turn under power and about 1/32" down thrust to kill a possible power stall. Size of these shims may vary considerably as it is almost impossible to make two nose blocks exactly alike.

The fully wound flight path is a very steep right spiral climb with the nose dropping gradually as power diminishes. The only indication of transition from power to glide is that the prop blades fold at about 1 min. 20 sec., to 1 min. 25 sec.

A word of caution—fuses are cheaper than airplanes . . . always light them!

Flight to Catalina

(*Continued from page* 16)

speed rose to approximately 50 mph, and it seemed to me that almost before he had an opportunity to turn it it would fly out of sight. However, Dick kept the airplane well in range. Dick set the trimmable elevator for a nice gentle glide, and as it came down for landing he kept putting in more and more elevator, and the big boat settled on the water as lightly as a feather.

Dick thought the airplane was a bit too sensitive but safe. At the end of the third flight Dick decided that it was largely a matter of becoming accustomed to the airplane's response, so we went home.

By now it was late September, and it became such a problem to get all of the crew together that we decided to postpone until spring. I dismantled the airplane and it lay dormant until March. Planning continued!

Stu Babcock, sailing enthusiast, had contacted some of his friends down at Newport Beach, with the result that Harry Callas, who owned an inboard speedboat, capable of 30 knots, joined the project. He would skipper, while Dick flew the airplane. Bill Glick and I would be mechanics.

An analysis of the weather history of the channel showed that in the summer time, when the atmospheric pressure differentials are relatively light, the prevailing wind condition in the channel was largely of a localized nature. During the day, after the land heated up, the air over the land would rise, and this would cause a wind to blow in from the sea. However, in the early morning hours the land temperature and the sea temperature were pretty close together, and unless there was a strong barometric disturbance in the area, only light variable winds would occur from around dawn until about 10:30 in the morning. We planned take-off shortly after dawn.

The shortest distance was approximately 20 nautical miles. This introduced problems of rendezvousing, with Bill Glick and myself driving down from the San Fernando Valley, while Dick Schumacher and Harry Callas came up the coast from Newport Beach in the speedboat. We decided to make the attempt right from Newport Beach. The flight distance was 29 miles.

Along about March 1st, it seemed logical that another test flight was in order, for two reasons: First, just to renew Dick's acquaintance with the airplane's response, and second, we wanted to make a take-off with a simulated full fuel load which we had not done in the first tests.

Since Hansen Dam was only about eight miles away, as compared to the 55 miles to Puddingstone, we decided to use Hansen Dam for these tests. However, we knew that we would have boat traffic, so the logical thing was to go up very early before the boats got too thick. I called Bill Frederickson, Superintendent of Recreation for the City of Los Angeles. Bill agreed to arrange for our early entry into the Hansen Dam recreational area, and offered the help and co-sponsorship of the Department of Recreation and Parks.

The first flight was uneventful. Dick had an opportunity to check low speed characteristics and found that low engine speed permitted the airplane to have a very gradual sinking rate.

The next flight was to be a take-off with a simulated full fuel load. We filled up the fuel cell with water. We used the short-run test tank for fuel supply. The plane took slightly longer to get up to flying speed, but it was ready to fly. Dick beeped a slight up. The airplane took off and started to climb. It also started a right turn. Dick gave it left rudder but nothing happened. The right turn was getting worse. It was apparent that the rudder at that angle of attack was slightly blanked and ineffective, yet the airplane was not high enough to put in down elevator. Dick did the next best thing and pulled up elevator and about that time the right wing hit the water and the flying boat cartwheeled into the lake. Everything got wet, and that concluded our flying for the day. We decided that if it were permitted to take off without using up elevator it would achieve enough speed so that the rudder would be fully effective and the uncontrollable right turn would be overcome.

Incidentally, we had decided on using a take-off because the airplane was so big that it was very unwieldy for a hand launch. We had thought about the possibility of launching from the bow of the chase boat but we decided that the take-off would be a less hazardous start. This meant that we had to have fairly quiet water.

It was June 28th, a Saturday morning. Friday afternoon, Bill and I loaded up the car. We all met that night. Harry Callas slept on his boat; Dick, Bill and I slept on Stu Babcock's boat. I didn't sleep very well! I kept thinking about elevator trim, needle valve settings, fog, wind, waves, everything that could cause possible trouble.

At 4 a.m. the harbor was solidly fogged in. We got everything ready to go, then sat and looked at the fog. In a little while Stu Babcock's sailboat, the Whirlwind, loomed up in the fog. Stu sniffed the air and said, "I think this fog is local, and we might as well head out to see what the situation is." As though someone had lifted a curtain, we broke into clear air.

We headed outside about a half mile up the coast, to get away from the churning wake of the albacore fishing boats. The speedboat was pitching and yawning as though it were in a heavy sea, but as we proceeded the sea calmed down a little bit.

(*Continued on page* 56)

MAN at Work

(*Continued from page* 4)

clubs and individuals who have already protested, and write to AMA Headquarters, the district VP's and your Contest Board members right now, before more damage is done."

The natives are restless.

• • •

► The 1958 Nationals will be held July 21 through July 28, at the U.S. Naval Air Station, Glenview, Ill., "just" outside Chicago. The last time we drove into the indoor events, it was a hefty "just." The United States Navy is host. Ten years running! Maybe we should give our business to the Navy. . . . Speaking of Glenview, that is where you get the free Navy plans. Right now, they have the Banshee, Bearcat, Corsair, Crusader, Cutlass, Dauntless, FJ-1, FJ-2, FJ-3, Guardian, Neptune, Savage, Skyraider, Skyrocket, SNJ, T-28B. Address the Chief of Naval Air Reserve Training, Naval Air Station, Glenview, Ill.; Attention: Procurement & Liaison Department. Navy sends out about 2,000 of these plans a month to modelers all over the world. They sometimes have to get an interpreter. You telling MAN, Admiral? . . . Smart promotion piece by Comet Model Hobbycraft is a 20-page booklet: Comet Dealer Ad-Mat Service. Displayed are dozens of advertisements (of Comet products, natch) which can be used by the company's dealers in local newspapers. The "mats" are supplied by Comet on the dealer's request. The whole idea is slickly done. The Windy City boys thought of everything. If the dealer uses "slick" paper catalogues, Comet will supply the photographs for making the engravings. Each sample ad is keyed, for quick reference, has space for the dealer's name and address. If a dealer uses TV time, Comet even supplies a five-minute film showing a father and son sharing the "pleasure and satisfaction" of flying a model airplane and tells how "model building builds model boys." It's the only such service in the model airplane field. Impressed. . . .

• • •

► Your opinion of the FAI power rules? Hear out Phil Kraft, the "Upstart" man. Last year's California area trials had 70 entrants—only 16 this year. Practically all, loaded down last year's models. While performance didn't suffer much, engine power is of utmost importance. Phil flew the veteran Upstart with 11 ounces added to make the required total of 31 ounces for his total area, got second (816 secs.) despite an erratic timer and the highjacking of the special fuel for the reed-valve Oliver.

"The rules discourage competition," maintains Phil. "There is only one engine really suitable and it is the Oliver, hard to obtain and expensive. Increased weight makes the model more subject to damage. You cannot build without adding weight because it is not feasible to build a structure that heavy; surfaces of an aircraft must be kept reasonably light because of inertia effects.

"The rules are supposed to eliminate fly-offs," Phil continues. "There is nothing wrong with fly-offs and the best model should be able to exceed the maximum flight time under average conditions. Then the first five flights become a sort of elimination contest to determine the fliers who compete in the sudden-death fly-off.

"Rules," he winds up, "should encourage competition by the greatest number of contestants, not just those with the most money and experience. They should give the average modeler a chance to win with luck. If they don't the experts will find it

(*Continued on page* 70)

Although the sea was well churned up, this was due largely to the boats, since the air was quite calm. We decided to take off. I held the flying boat alongside the chase boat while Dick worked the engine speed control from low to high speed, and then I let the flying boat go. It churned through the water like an angry swordfish, but after about 20 feet it found a fairly level spot and managed to get up on the step, and then battled with the waves. It would disappear momentarily from sight, and then reappear on the crest of the next wave. It was holding a straight course and appeared to be just about at flying speed when a little chop would throw spray into the propeller and slow the engine down, then the engine would pick up again and the process would would be repeated. Dick decided he'd better try a little up elevator, although he knew the danger.

The up elevator worked, and the flying boat was in the air. Unfortunately, it did not have sufficient flying speed and was at the critical angle of attack where the rudder was blanked out. It rose to about 15 feet in that uncontrolled right turn which became worse and worse, and once again the airplane cartwheeled into the water.

On the way back we cleaned the salt water out of the engine and ran it for a short period of time. However, there wasn't much we could do with the radio, servo and escapements until we got into shore. We flushed all of the parts with fresh water. The problem of removing, flushing, and reinstalling all of the equipment, took the rest of the day.

The next morning there was no fog, but you could hardly see the water for the fishing boats. Again we went outside the harbor and about a half mile up the coast.

We tried three times. The first time spray kept flying up into the propeller from the choppy sea, and finally stopped the engine. The second time the airplane finally managed to get up on the step, and was going at a fast clip and Dick stuck to his decision not to use up. With no up elevator the airplane finally lifted from the crest of one wave, only to slap into the next wave with a resounding crash, and the spray went up over everything, again killing the engine. The same thing happened again, except instead of hitting the next wave with the bottom of the hull the nose actually penetrated into the wave, shifted the wing, water got inside, and that ended the attempt. It was not possible to repair the salt water damage and try again that day before the wind would come up, so we gave up for the time being.

Finally, it was Friday, September 22, 1956. Before Bill and I went to bed we fueled up the plane and then sealed the hatch with some plastic sheet. We put in some crystals which would absorb any moisture that might tend to form inside the hull. So, except for winding up the rudder escapement and putting the wing on the plane, everything was ready.

Saturday was a murky overcast day, and the visibility was not too good. As we went past the mouth of the harbor a fresh breeze hit us in the face. However, we went on out to where we had previously attempted the take-offs. About 10 o'clock it did quiet down. This was the last chance that we would all be able to get together for sometime, and it was late in the year, so we decided to have a go at it.

Dick was acutely aware of the danger of an up elevator command, and as the flying boat tore madly across the water, bouncing crazily from one wave to the next, Dick let it go. It finally bounced into a wave so hard that the spray stopped the engine. We went over and retrieved the airplane. There was no apparent damage, except that the propeller tips were completely frayed from hitting so much spray. The radio seemed to be working all right, and it did seem as though the sea was getting a little calmer. We decided to have another try. Since the engine had been running for only about three minutes, we didn't have to refuel. Again she was charging across the waves, and finally bounced into the air. It was just about to plow into the next oncoming wave when Dick gave it a small amount of up elevator; up came the nose, and you could see the start of that right turn. Right then Dick gave it some down elevator and then applied some quick left rudder. The airplane continued to turn right, but as the nose came down all of a sudden the rudder took hold and the airplane straightened out and was flying straight and level about five feet off the water. At long last we were in the air and the model was under full control!

However, it was moving at about 45 mph and, although Harry had the chase boat wide open, the flying boat was disappearing into the murk ahead of us. Dick brought it around in a wide sweeping turn to the left and applied a little up elevator. The airplane shot up to 200 feet altitude almost before he could correct. Then when he applied a slight amount of down elevator apparently the fuel load moved forward as the nose came down and made the down elevator even more effective. The airplane started to come screaming down at about 55 to 60; Dick pulled up elevator, leveled it out, and finally got it fairly well set for level flight. However, when flying level the airplane was flying at about 45. Dick was so busy flying it that he did not really have time to try to put the engine into low speed. (Three for engine is awkward off an escapement—Editor). So, with the airplane racing madly through the sky Harry set a course for Avalon, put the chase boat at its cruising speed, and away we went with Dick gingerly trying to keep the airplane both at the right altitude and in sight.

In nine minutes we had gone about four miles while the airplane had been circled overhead. Suddenly Dick cried, "Hey, something's wrong, the elevator servo keeps creeping down."

I started back to get the other transmitter. While my back was turned I heard a great groan, and Dick said, "Never mind, it's too late." I turned around in time to see one wing of the flying boat fluttering through the sky. The hull with the other wing and the engine going full speed was driving straight down into the sea, with the wing making it rotate slowly. It must have been doing around 75 miles an hour when it hit, throwing spray 10 to 15 feet into the air.

Parts were scattered all over the sea, that is, those that would float. The drive home was a long and mournful one. When we got home we tossed the remains in the corner of my garage and tried to forget about it. Then we learned that by coincidence, at exactly the same time that we were under way with the flying boat, a group of model boating enthusiasts were operating a model cruiser in the Newport Harbor, and they were using the Babcock three-channel equipment just like ours.

Then, one day, Bill Glick and I talked about making up a "quick and dirty one-shot" job. Neither of us was very enthusiastic. After this conversation I went back and pulled out all of the parts and wreck-

(*Continued on page* 58)

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age and looked it over. We decided to rebuild. The airplane was far too fast. We should make some changes and slow it down. Altitude control should be accomplished by engine speed rather than by elevator trim. We thought about using single-channel equipment, but we decided that this would be too critical at the end of the flight when we wanted to bring the airplane down.

(To be Continued)

Radio Control News

(*Continued from page* 31)

the time this reaches you.

From Lafayette Radio, 165-08 Liberty Avenue, Jamaica, N.Y., some imported items not tested by us yet, but here is the available data. The receiver complete with tube and relay measures 1¾" x 2¾" x 3". The transmitter, complete with tube and 27.255mc crystal, measures 1¾" x 2¾' x 8½. The electro-servo gives left and right control, plus return to neutral, ideal for boats and cars. The range of the receiver-transmitter combination is claimed to be one mile. We checked previous RC gear from Lafayette and found the operation to be satisfactory.

World Engines, Box 136, Montgomery Station, Cincinnati, O., announces their new Installation-Pak. The circuit is basically the well proven detector design by Jack Port, in the Controlair SM-1. A transistor has been incorporated to give a total relay change of over 4ma. All batteries for the receiver are self contained and this includes the actuator batteries. All you do is hook up two wires to your actuator. This unit sells for $24.95, ready built, no kits. We've used and tested the SM-1 receiver and, therefore, would not hesitate to recommend this to beginner or expert alike.

For those endurance and distance flights, you might check the availability of the Burgess "Reserve Type Power Units." These are one-shot, high-power batteries which are activated by the addition of plain water, prior to use. A unit the size of a pencell has a voltage of 1.5 volts, a life of 12 amp-minutes and is capable of supplying up to three amps. A unit the size of a D cell has a voltage of six volts, a life of 25 amp-minutes and will supply up to five amps on a surge. Many other variations in size and capacity are made. The silver chloride-magnesium types are more stable and have a higher output rating per unit volume, and are smaller than the cuprous chloride-magnesium types. These batteries are very light in weight and are used in missiles and other applications where "one-shot" power (up to 24 hours), long shelf life and no initial charging is required. Check your local Burgess distributor.

Technical Topics

Since we missed an issue of our column due to extended coverage of the NATS, the RC speed timing device announced has been delayed. However, for those of you who want to give it some thought, here is the basic concept. The tracking station consists of two vertical "hairlines" and an eyepiece with a 1/16" peep hole. This section is mounted on a free swinging but play-free gimbal, allowing an unobstructed swing from left to right and up and down. An adjustable slip-ring and contact will make a circuit at a predetermined point of the horizontal swing. This signal will trip the timing device. The unit at the end of the course will track the plane until it crosses the finish line, at which time it cuts off the timing device at the starting end. Timing for the return run is carried out in a similar manner, with no resetting or re-

(*Continued on page* 60)

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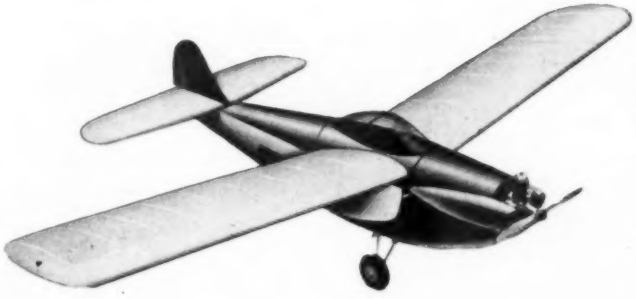

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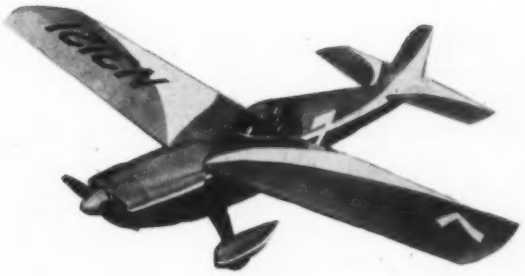

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56" Wing Span, .09- .23 engines

SIZE 6 7/8" x 2 7/8" x 2 7/8"

"MAGIC WAND" TRANSMITTER

LOW PRICE and Hi-QUALITY combine in Babcock's BCT-10 to make it today's most wanted transmitter! Don't let its small size fool you! It is as versatile, dependable and easy to handle as most high priced equipment. "QUICK LACE" means just that — the coil, condensers, resistors, etc. lace through eyelets in the pre-assembled chassis and are quickly soldered. It's really EASY and FUN to assemble this complete kit. Regular size batteries insure long life.

BCT-10 TRANSMITTER 27 MC	
27 MC "QUICK LACE" KIT	$ 19.95
FACTORY ASSEMBLED	$ 24.95

"MAGIC CARPET" RECEIVER

Companion to the "MAGIC WAND" the "MAGIC CARPET" receiver features Babcock's new "TRANS-FLEX" circuit. Two transistors, a crystal diode, 1AG-4 tube and the BR-3 Relay work in a reflex circuit to give unmatched range and fail-safe performance. Long life battery complement consists of one 30V hearing aid and one pen cell. Installed weight of receiver is 2 ounces — 4 ounces with batteries. "QUICK LACE" type, like the transmitter, it laces together in just minutes.

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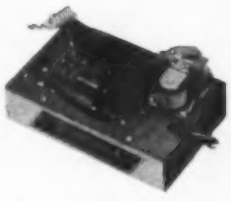

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calibrating of equipment. We believe this system eliminates 90% of the human errors, is not critical of the plane's altitude or distance from timing stations. It is electrically operated and may be run from a portable current source. Response time is about 50 milliseconds. This is not an expensive unit to build and it would make an excellent club project.

This next subject might be classified under New Items, but we thought we'd go into a technical discussion instead. B & S Products, Box 121, Babylon, N.Y., makers of the famous B & S Converters, now has a revolutionary new receiver. In our opinion this receiver has reached the near ultimate in RC gear. Basically, the circuit uses a 6007 detector tube, several transistor amplifiers, a relay transistor and a transistor power converter. This line-up means that a total of but three volts will operate the entire receiver. The three volts can be supplied by two pencells, giving an average life of about 1½ to 2 hours. No signal drain on the pencells is about 35ma. The relay current changes from 0 to 15ma upon receipt of a signal, thus giving a signal received drain of about 50ma on the pencells. The prototype model which we checked used a 200-ohm Kurman relay. Sensitivity and range were phenomenal, with sensitivity being comparable to that of a gas-tube receiver. In place of the relay, it is possible to use an actuator, such as the NEWX escapement with the proper type coil. While we only saw a prototype model, it is believed that total flying weight can be less than three ounces. This figure includes the radio gear, switches and complete actuator system with power supply. This is truly a step forward in RC gear, the last step being to replace the 6007 with a transistor. In the meantime, we feel that tubes such as the 6007 will be used for quite sometime. A nice feature of this receiver is that it will operate with any carrier transmitter built for 27.255mc, no tone needed. Any ideas—such as endurance flights?

By this time you have probably heard that Raytheon is coming out with a new improved RK-61 tube. And you were probably as skeptical of the announcement as we were. However, we checked a considerable quantity of the new RK-61-A tubes, putting them through tests very few people ever do. Results show that the 61-A tube is definitely an improvement over the old 61. The question is, can Raytheon maintain production standards to assure the tens of thousands of users of this tube that they will be up to the standards checked by us? We sure hope so. In the meantime here are some brief results of the tests: Inherent noise level is considerably increased; idle current for a given plate-circuit resistance is higher; flutter (as noted on a meter) is reduced and last but not least, several tubes were given a life test under actual operating conditions and the time exceeded 240 hours, continuous operation. One thing we'd like to point out as a finding of these tests, is that plate-current flutter should not be considered a criteria of a good tube.

Fig. 1 shows a clever method used by Elmer D. Taylor, 51-01 39th Ave., Long Island City, N.Y., for anchoring switch wires when the switch is mounted on a hinged door (Rudderbug type). Use a DPDT switch instead of a SPST or DPST unit, and clamp two end terminals around the wires, which have been covered with a length of tubing. This idea prevents pulling and subsequent breaking of wires and

(*Continued on page 62*)

Guillow's Re-live the WORLD WAR I air story!

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joints in such installations.

This month we'll continue with some basic explanations of interest to the novice. How tubes operate is essential information prior to putting a tube and the required components into an operating circuit. The basic tube is a diode, as shown in Fig. 2. This consists of a source of electrons, such as a heater filament or heated cathode sleeve, and a plate or anode. First it must be remembered that all materials emit electrons. The rate of emission is dependent upon the type of material and its temperature. For tubes used in RC work, the filament or cathode surface is coated with oxides of caesium, barium, strontium and other elements. These materials have the property of emitting electrons rather readily at relatively low temperatures. When an electron leaves the filament, or cathode, it acquires a negative charge, thereby leaving the filament or cathode positively charged. Without another element in the tube, such as a plate, these electrons bounce around until such time as they return to their source. If a plate is placed in the tube envelope and is connected to the positive pole of a battery, with the negative pole being connected to the filament or cathode, then the plate is positive with respect to the filament. Since the electron which left the heated filament is negative, it is attracted to the plate, or positive potential. Each electron that arrives at the plate makes for an infinitesimal electric current. When a sufficient number of them reach the plate in a given length of time, a current, measurable on a meter, is obtained. Plate current is generally expressed in milliamperes and its symbol is I_p. This now gives us a diode, or two-element tube with current flowing in one direction.

In order to control and better use this flow of current, a third element, or grid, is required. The grid, shown in Fig. 3, acts as a valve to this flowing stream of electrons. With no potential applied to this grid, there is a practically uninterrupted flow of current. The grid can be used to produce a higher plate current flow between filament and plate, or a lower flow, depending upon its potential. Fig. 3a shows what happens to the electrons when the grid is slightly more positive than the filament. In this case, it attracts and accelerates electrons towards itself. Once in the region of the grid, the electrons continue through the wire mesh on to the plate, which is at a higher potential. When the grid is negative with respect to the filament Fig. 3b, it acts to repel a majority of negative electrons, hence fewer electrons reach the plate and hence less plate current flow.

The degree to which the grid affects the plate current flow is dependent upon the negative or positive voltage on the grid and the spacing between the three elements. The grid being a fine wire mesh, or spiral winding of fine wires, allows electrons to flow through it, thus giving a cushioning effect on the plate current flow. If the grid were designed so that upon the application of a negative voltage, plate current would abruptly stop, it would have little use for control purposes in regular tubes. The negative voltage on the grid may be applied by an external battery, connected with its negative terminal to the grid and the positive terminal to the filament ground, or by self generated bias in the circuit itself. We shall go into this at a later time. In addition to the control grid of a tube, there is another grid commonly known as the screen grid, located between the control grid and the plate. It also controls the flow of plate current and is a useful input for injecting other signals and voltages into the tube. This will also be covered in a later column. Here again, we suggest you visit your library and obtain a good book on radio theory for further explanation. The ARRL (Radio Amateur Handbook) is an excellent source of information for the novice and expert alike.

Those of you desiring to go into multi-channel work should give serious thought to trimmable elevator control. This is a must for smooth even flights and is essential for speed and distance flying. A trimmable elevator will take care of the variance in flight characteristics between upwind and down-wind flying.

Club News

One of the finest looking club groups we've seen in a long time, both from the standpoint of well built ships and the neat club attire of each member, is the Indian City RC Club, of the Down River area of Detroit, Mich. Four of the members flew at the NATS and Walter George, middle row right, took 3rd in rudder only. Most of the members use single-channel gear but multi-channel work is catching on fast.

Mike Kirby, 385 S. Marengo Avenue, Pasadena, Calif., sends photos of his Double-Delta, measuring 88" in length, 36" wide and weighing 7¾ pounds. A McCoy .35 hauls this 1,285 square-inch job and radio gear consists of a Babcock Magic Carpet receiver, Bonner Vari-Comp and a Bonner motor control. Reports during October, indicate the Double-Delta is still running taxiing tests. Mike, after over 30 years of building original designs, is not giving up and we'll have more on this unique RC job in future columns. Mr. Kirby praises the LARKS for their help in assisting him on test flights and in helping all newcomers to RC work. Would that we had more groups such as this around the country giving out information to the novice. His Baby Starlight, measures only 18" in span and is 12½" long, powered with a Pee Wee .20. The receiver is the new Deltron 109, completely transistorized and the rudder is actuated by a simple escapement. Does this give anyone ideas on small 'parlor' size RC models? If it does, why not look at the new Berkeley scale designs for the .020" engine?

The LARKS report that Ken Willard spent about two years and $1,200 in preparing for, and making his Catalina Channel crossing. His next attempt at a record will be for RC endurance, now held by Russia, and then the RC across country record. Do the rest of you RC fliers intend to let Ken win all the honors this coming year? The LARKS had a Flying Circus a few months back and it was really a circus. Space does not allow us to give all the happenings, but here are a few of them: Bill Williams flying two RC jobs simultaneously; Colby Evett cutting one tethered balloon loose and Dean Kenney swooping down to get it; Fred Dunn having Howard Bonner test hop his Astro-Hog, which is a low wing Smog-Hog and Dean Kenney putting on a rainstorm over the crowd. Sounds fine, and we'd like to get more info on that rainstorm, although the California boys manage to drop anything that can be fastened to an airborne crate. Doc Hauck put on this fine exhibition and also holds the west coast honor of recording, in color, the birdseye view of the flying field as he made a landing with his modified Cruiser.

News via the Modulator (Pioneer Radio Controllers) advises that Bob Dunham, NATS champ took first place in open competition with his Astro-Hog. Fred Dunn also took first in the Novice Multi-channel

(*Continued on page* 64)

The "OTHER ONE"?

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event with his Astro-Hog design. Looks like the low wingers might be coming into their own. On September 2nd, Bob Foncell raised his 7' modified Cub into the air at 12:09 p.m. At 12:23 p.m. this 10½ pound ship was down from its maximum height of 1,000 feet and a new cross country record was established at 4¾ miles. The goal was five miles but Bob was within the 1,000 meters from point of flight-plan landing.

Before leaving the west coast, the Aerial Robots, 220 Oakshire, Modesto, California, are looking for new members, with planes, gadgets, circuitry and ideas in general.

Photos of a modified Mig 19 and Ercoupe was built by V. A. Salvador, 80 Gen. San Luis, San Juan, Rizal, Philippines. The Torp .15 powered Mig uses a Lorenz receiver, Bonner simple escapement, with a Mac II transmitter. From the first flight on it has flown perfectly and from the picture, this is one of the most unusual and successful RC jobs to hit this column in a long time. Vic is anxious to correspond with anyone desiring to do work with ducted fans, especially with RC.

This is another reminder to get your FCC registration in if you haven't already done so. With the possibility of new frequencies coming up, every vote counts. We suspect it is the old timer in RC work who neglects this thing, since almost every manufacturer of equipment mentions this in his manual, and many even send you a form to fill out.

Maynard Hill, 309 Princeton Drive, Pittsburgh, Pa., wants to remind everyone in the east that the Selinsgrove get-together, over the Labor Day weekend, is an invitational affair and anyone wishing to attend in '58 should drop him a line. This affair is still one of the highlights of RC flying in the east. The '57 event was characterized by no complaints of interference, spectacular flying by all and by Walt Good and Hal deBolt in particular and by the usual genial crowd and good flying site. Equipment was divided about evenly between reed jobs and dual-proportional systems, with very little rudder only activity.

Quite a few inquiries have come in from Canadian RC fans regarding licensing rules. The Canadian frequencies closest to those used in the USA are, 27.12mc, 40.68mc and 915mc. Some of the ways in which Canadian rules differ from ours is that they are allowed a maximum of five watts of antenna power, frequency tolerance on 27.12mc of .01% and all spurious radiations to be at least 30 db below the carrier level. In addition to transmitter requirements, the receiver shall not dissipate more than 400 micromicrowatts into a 50ohm termination. These requirements are much stricter than those of the USA, therefore, this is another reason to comply with the FCC rulings. Send in your FCC registration form NOW.

Bill Kenyon, R.D. #2, Manlius, N.Y., sends us in a bit of news about the Fall Flying Festival and Hobo Meet, put on by the Syracuse Sky Knights. The Sky Knights have offered their flying site to any club group wishing to hold a contest or a get-together. This excellent spot is located in central New York State and the only requirements for using it, besides getting in touch with Bill or George Pearce, 18 Wellington Rd., North Syracuse, N.Y., is to have an FCC and AMA license. The Syracuse area is strong on our two-tuber circuit, especially for the beginner to build himself, and excellent operation is ob-

tained using this type circuit with a Galloping Ghost actuator.

As this issue was buttoned up, two days past our deadline, the East Bay Radio Controllers have announced, through the Carrier, that the EBRC group now hold all official Bay area trophy records, as of October 1st. Bob Heise, flying an Ascender with Babcock three-channel, has speed of 50 mph; Tom Williams with a Smog Cruiser and Deltron radio, has a time of 1 hour 1 minute and 28 seconds; and Glen Carter, flying a Royal Rudderbug with Babcock single-channel, has traveled eight miles. With flying like this, is it any wonder the west coast did so well at the NATS?

Foreign Notes

(*Continued from page* 35)

Australia during the past year or two. O.S. Max engines largely dominate the contest classes and, to some extent, have replaced both Australian and American equivalents for stunt and combat. In Class B team racing, too, the accepted leaders are being strongly challenged by the O.S. Max 29. Possibly Japanese engines would not have achieved such wide popularity had not hard-currency restrictions prevented a full range of American motors being freely offered on the Australian market, although it must be admitted that many O.S. contest successes have, in fact, been achieved against well-known and universally accepted favorites.

Japan

Mention of O.S. brings us to the latest Ogawa design which is an International Class Diesel. This motor has been under development for over a year, during which time all types of layouts have been tried, featuring disk, reed and shaft induction, plain and ball bearing shafts, and loop-scavenged and reverse-flow scavenged cylinders. The design that has now been adopted for production is a front rotary job, having twin ball bearing shaft and loop-scavenged cylinder. Most interesting is the fact that, unlike any of the few existing Diesels using loop scavenging, the prototype has a baffle on the piston and a contra-piston specially contoured to suit.

In Brief . . .

South Africa . . . We hear of quite a boost in multi-channel RC interest following Howard Bonner's demonstration tour there and the availability of the latest U.S. multi-channel (mostly Orbit and C.G.) equipment in S.A.

England . . . A new British hand-launched RC glider record has been ratified. Record goes to the old-established Northern Heights Model Flying Club (London), three modelers, headed by former Wakefield expert Bob Copland, having shared control in half-hour spells. (Incidentally Bob competed in the U.S. as a member of the Wakefield team, way back in '39.) Model, which spans 6 ft. 4 in. and has 650 sq. in. wing, stayed aloft for 3 hrs. 39 min. 27 sec.

Italy . . . Expected in due course from the Super-Tigre factory is the G.20V, production version of the latest works variant of the G.20 .15 cu. in. racing glow engine as used by Amato Prati and Paulo Berselli in the recent World Championships. The rear induction G.30 .15 Diesel may also become available in a cheaper version having a plain bearing in place of present twin b.b.

Russia . . . New Russian national record in the International speed class (2.5 cc.

(*Continued on page* 66)

—.15 cu. in.) is reported to have been set at 197.8 km./hr. (122.9 mph).

Poland . . . Following on the efforts of Hungary and East Germany to sell their model engines in the west, comes news of attempts to export the Polish Jaskolka engine to the Scandinavian countries and elsewhere. We are informed that, to encourage this, the Polish authorities are preparing to pay a subsidy sufficient to absorb import dues in the case of the Danish market. The Jaskolka is a radial-port, shaft-valve .15 cu. in. Diesel of ordinary design, for which the slightly optimistic output of .28 bhp at 17,000 rpm is claimed.

What Happened at Prague?

(*Continued from page 25*)

not looking too happy about the flight circles. These had been specially prepared, but consisted of coarse red sand, watered and rolled to produce a hard packed surface. There are those among us who believe that sand and model airplane engines cannot be kept too far apart and that, to operate a speed model from such a surface is a needless hazard. As things turned out, rain gave the circles an unscheduled wetting on the Friday night, necessitating the postponement of the start until after lunch on Saturday. The contest was divided into three rounds; the best of each contestant's three flights to count towards the Individual and Team results.

After the results of the Criterium d'Europe speed event in Brussels, two months earlier, it wasn't too difficult to guess at the outcome of the World Speed event. We gave the Czechs to win, with the Italians as runners-up in the team event. It must have been obvious to the Czechs before the meet that they had the team championship virtually in the bag. Three of their team, Sladky, Smejkal and Zatocil had all flown in previous World Championships, as well as at Brussels, and must have had the opposition pretty well sized up. The Czechs had the motors for the job and they had the experience.

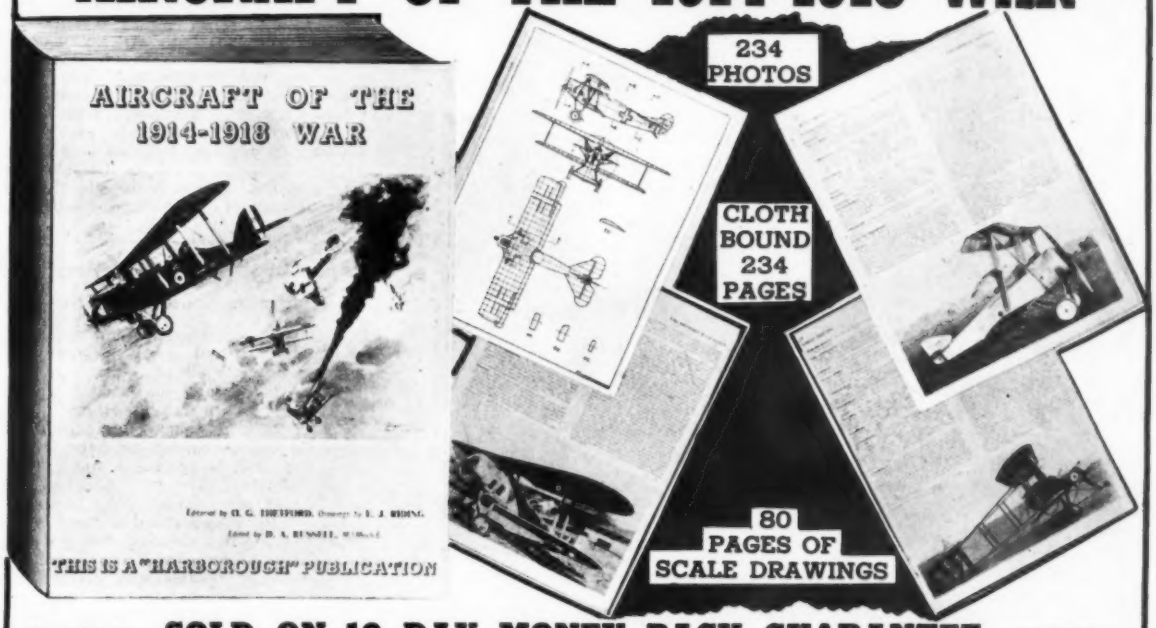
Undoubtedly the biggest threat to the Czech hopes for the individual award was Gibbs, 1956 Champion and holder of the world 2.5 c.c. class record. At the previous year's Championships, Gibbs had won at a record speed of 211 km.-hr. (131 mph), more than nine mph faster than the speediest Czech, but, at Brussels, Sladky had reached 209 km.-hr. (nearly 130 mph) where the best Gibbs had managed had been 202 km.-hr. Would Gibbs repeat his 1956 performance, or had the one and only Carter-McCoy Special passed its prime?

The Czechs soon had their answer. On its first flight, Gibbs' model accelerated away and was soon lapping with what appeared to be all its usual urgency (its speed over the opening laps was put at approximately 215 km.-hr.—nearly 134 mph), but at the beginning of the sixth lap, the British challenge came to a sudden and disastrous end as the Carter Special cut dead. When the upper shell was detached from the pan, it was found to contain the complete cylinder assembly neatly severed through both casting and sleeve, across bypass and exhaust stack, from the crankcase.

The Italians too, were in trouble. Neither Giovanni Cellini, who had put up such a good performance with the Testa Nera Barbini B.40 engine in '56, nor Renzo Grandesso, fresh from winning

(*Continued on page 68*)

"AIRCRAFT OF THE 1914-1918 WAR"



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IN ADDITION: a further 24 Aircraft are described with large photo, complete dimensions, weight, armament, etc. As with the first 80 Aircraft, full information is given as to the squadrons that these planes were issued. Yet another 94 more British, German, and French are shown of the "Experimental" and "Rare" types.

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GULL MODEL AIRPLANE CO. 10 E. OVERLEA AVE. DEPT. M-9 BALTIMORE 6, MARYLAND

at the Giornate Ambrosiane meet in Milan, recorded a flight in the first round, Cellini being convinced that sand was to blame for his failure to get his motor running properly. Former world record holder Amato Prati, however, turned in a flight of 192 km.-hr. and, proxy flying for youngest entrant Paulo Berselli, returned 189 km.-hr.

When the Czechs took their turns, everything went according to plan; Josef Sladky, 205 km.-hr.; Vaclav Smejkal, 204 km.-hr. Miroslav Zatocil, 202 km.-hr. Only the new boy of the team, Frantisek Pastyrik, no doubt remembering his place, contented himself with a mere 194 km-hr. Nevertheless, there were a couple of surprise performances. Russia's Michael Vasilchenko turned in a flight of 194 km.-hr., to equal Pastyrik, and Hungarian Gyula Krizsma caused a sensation by equalling Sladky's time. Of 32 contestants, no less than 18 failed to return an official flight in this round.

In the second round, Sladky & Co. evidently decided they would stand no nonsense from Russian or Hungarian comrades and both the Maestro himself and Zatocil reeled off a cool 211 km.-hr. while even new boy Pastyrik was permitted to put his foot down and steam round at 208 km.-hr. Only Smejkal forgot to turn up the wick and merely repeated his 204. In reply, Krizsmo failed to record a flight and the Russian challenge evaporated. The Italians, however, now got back into the picture with a 197 km.-hr. flight by Grandesso and Prati pushed his speed up to 198, also flying Berselli's model nearly as fast at 197. In this round, 12 failed to record a score.

In the final round, flown the following morning, Sladky pulled out all the stops and returned a shattering 216 km.-hr. (134.2 mph) a new record for the event, while Zatocil achieved 214. Pastyrik failed to get away but his previous best assured him of 3rd place and Smejkal just failed to dislodge Hungarian Krizsma from fourth place. Italy's Grandesso now became the only other contestant to go over 200 km.-hr., his 204 giving him 6th place, while Miclos Vitkovics (2nd last year) suddenly jumped from 12th to 7th with an even 200 km.-hr. All but eight competitors recorded flights in this last round.

On the technical side it may be mentioned that all the top performing motors were "specials" in one way or another. The Czechs had a new version of their MVVS racing .15 specially developed for these events by the Model Research Center at Brno. Looking like a miniature Dooling, it has rear disk induction, twin ball-bearing shaft and ringed piston and ran on a fuel containing 45 percent nitromethane.

The Italians used the latest works-prepared version of the Super-Tigre G.20V (the V stands for Velocita) and Barbini B.40TN stands for Testa Nera—"Black

1957 WORLD CHAMPIONSHIPS
A/2 Glider Results

1.	Babic	Yugoslavia	15:00
2.	Sokolov	USSR	14:14
3.	Hadzovic	Yugoslavia	13:57
4.	Simonov	USSR	13:55
5.	Zsembery	Hungary	13:54
6.	Michalek	Czechoslovakia	13:31
7.	Kunz	Germany	13:20
8.	Hannay	Great Britain	13:15
8.	Hansen H.	Denmark	13:15
10.	Medaglia	Italy	13:12

TEAM RESULTS

1, USSR, 2,473 points; 2, Yugoslavia, 2,466 points; 3, Czechoslovakia, 2,241 points; 4, Hungary, 2,229 points; 5, Germany, 2,214 points.

Head"). The G.20V follows the twin ball-bearing, shaft-valve layout of the previous G.20's, but has a new casting with enlarged oval intake, a bigger bypass and a new head. The B.40TN is a reverse flow scavenged motor (twin opposed exhaust and twin bypasses) and uses a roller and ball bearing main with needle bearing big-end, It, too, has shaft induction. The Carter Special used by Gibbs, was based on the case of a McCoy Red Head 19, with new internals, sleeving and de-stroking down to the required .15 displacement. The rest of the field showed a fair sprinkling of Super-Tigre G.20's, ranging from disk-valve conversions down to more or less stock motors.

Models followed the usual layout, mostly with metal pans and wood surfaces. Pen bladder tanks were used by most of the top entries, including those of Gibbs and the Italians, but the Czechs still stick to their special metal tanks which seem to work exceptionally well.

1957 WORLD CHAMPIONSHIPS
C/L Speed Results

		km/hr.			*Fastest time in mph*
1. Sladky	Czechoslovakia	205	211	216	134.22
2. Zatocil	Czechoslovakia	202	211	214	132.97
3. Pastyrik	Czechoslovakia	194	208	–	129.24
4. Krizsma	Hungary	205	–	203	127.38
5. Smejkal	Czechoslovakia	204	204	203	126.76
6. Grandesso	Italy	–	197	204	126.76
7. Vitkovics	Hungary	–	184	200	124.27
8. Prati	Italy	192	198	197	123.03
9. Berselli	Italy	189	197	180	122.41
10. Vasilchenko	USSR	194	185	191	120.55

TEAM RESULTS
1, Czechoslovakia, 638 pts; 2, Italy, 599 pts; 3, Hungary, 594 pts; 4, Russia, 551 pts; 5, Sweden, 499 pts.

IMPORT REVIEW

(*Continued from page* 38)

to the larger intake port.

Emphasis on efficient breathing is further evidenced by the design of the new crankcase-cylinder-barrel casting. The bypass has been opened out to immense proportions and features an extremely smooth and unrestricted entry from the crankcase. Contributing factors here are the short liner and carefully shaped back wall of the crankcase. The bottom edge of the bypass port is lowered slightly giving a less acute angular flow into the combustion chamber.

Stroke-bore ratio has been increased from .895 to .956. The connecting rod has also been shortened, so that these two modifications combine to increase conrod angle and side loading on the piston, but this is in some measure compensated by a slightly longer piston. A new rod, with increased small-end bearing area, but retaining a bronze bushed big end, is used. The complete piston and rod assembly is fractionally lighter than before at .55 oz. The hollow crankpin has been increased to ¼-in. diameter and the crescent counterweight balances the crankpin and half the conrod weight.

The 29-III is soundly engineered for adequate heat dissipation and long life. The cylinder liner is hardened, of heavier wall thickness than hitherto and is closely fitted to the casting. A metal-to-metal head joint is employed, the top edge of the liner being ground for this purpose. Preservation of adequate strength in the hardened crankshaft is assisted by the use of the rectangular front bearing intake aperture since this avoids an unduly wide and weakening crankshaft port for a given valve area. Three interchangeable plastic venturi inserts are provided, according to fuel-suction vs. speed requirements, the largest being 5/16-in. diameter. Alternatively, where maximum peak bhp is required, the insert can be discarded and a bladder-tank pressure system employed.

On test, it took about ten seconds to discover that the Enya 29-III was a thing apart from all other foreign 29's we have tested and, for sheer get-up-and-go, closely rivals the best domestic 29's yet seen. Using 30% nitro, an Enya No. 6 platinum-rhodium plug and the largest venturi insert, we recorded a maximum torque of 53 oz. in. at 12,000 rpm, which, equivalent to a brake means effective pressure of 70 lbs. per square in., is fantastically good and in excess of the figures formerly obtained for the best disk-valve b.b. racing 29's. Maximum bhp recorded was just on .70 at 15,000, which, again, is quite outstanding. All this is obtained with easy starting and smooth, consistent running qualities.

The 29-III is of pleasing appearance with well-produced matt-finished castings, relieved by polished aluminum and nickel fittings. Bore and stroke are .735 x .704 in., giving a displacement of .299 cu. in. and weight is 6.8 oz.

The Allen-Mercury 25 Mk. II

In Europe, the reverse-flow scavenged, plain bearing, shaft-valve .15 Diesel is virtually a cult. Scores of engines to this basic design layout from a dozen different countries have appeared over the past nine years and there remains a steady market for them despite the introduction of more elaborate motors of higher performance. The advantages of the layout are to be found mainly in its compactness and simplicity, allowing both weight and price to be kept to the minimum.

One of the best engines of this type that has so far been produced in Britain is the .14 cu. in. Allen-Mercury '25'. This is a logical design, better built than most and eliminates some of the failings of earlier engines in this group. The very first Allen-Mercury engine to be put on the market, the AM-25 was originally introduced in the summer of 1954. It has undergone minor modifications since and our report concerns the latest 1957 model.

Ruggedness is the keynote of the Mk. II 25. The shaft, of S.14 steel and casehardened, had a full ⅜-in. diameter journal. The cylinder liner, of Meehanite, has a wall thickness of over 1/10-in. above the ports and is clamped by means of a flange between the black anodized dural cylinder barrel and the pressure-cast crankcase. Four long screws tie the cylinder assembly to the case. The conical-crown, short-skirt piston is equipped with a 5/32-in. diameter wrist pin and is of Meehanite, as is the contra-piston. A machined duralumin conrod is used.

The AM-25 has four radial exhausts, and four radial bypass ports of equal area,

ADVERTISING INDEX—JAN., 1958

and a 360-degree bypass passage, .030-in. wide, is formed between the liner and case. The circular valve port is relatively small and gives an induction period of approximately .23 bhp. Slightly heavier than the however, is augmented by a sub-piston supplementary air induction period of approximately 60 degrees of crank angle. The cylinder, incidentally, has a tapered bore, a feature seen on many European Diesels, which is aimed at achieving maximum piston seal where it matters most, with reduced friction over the remainder of the cycle.

In regards to performance, the AM-25 is well up to expectations. Starting is quite easy and the motor runs evenly right up to the peak rpm, which are in the 12-13,000 bracket, maximum output being approximately .23 bhp. Slightly heavier than the Mk. I version (which had a lighter cylinder construction) the AM-25 Mk. II weighs 4.4 oz. It has a bore and stroke of .5625 x .570 in., giving a displacement of .142 cu. in.

The Webra Sport-Glo

If we were asked to suggest a foreign engine suitable for a beginner, the German Webra Sport-Glo would come close to the top of our list, for it is certainly among the most docile and easiest starting model motors we have ever handled. Not only does the Sport-Glo respond quickly to correct starting procedure: it will also splutter into life when grossly overprimed. These easy handling characteristics are no accident. One of the duties envisaged for the Sport-Glo was its use as the standard power-plant for the ready-made Hegi-20 model plane introduced by the big and famous Schuco toy firm. Schuco wanted a near-foolproof motor and the Sport-Glo was Webra's answer.

The engine is a simple and straightforward design, but with one or two features that take it out of the rut. Although provided with a single, wide exhaust stack on the left side, it is actually a reverse-flow scavenged engine with twin-opposed exhaust ports and twin internal bypass flutes. These ports are staggered 45 degrees so that an uninterrupted bore surface is offered to the ends of the full-floating wristpin. One exhaust port discharges into the forward half of the exhaust stack and the other port exhausts into a collector ring communicating with the stack.

The cylinder has integral fins and is located in the pressure cast crankcase by a flange below the exhaust ports. Two long screws, fore and aft, tie the complete cylinder assembly to the case, an extra pair of short screws securing the sides of the head to the cylinder. The cast-iron piston is flat-topped and long enough to preserve good compression seal. A machined steel conrod is used. The shaft, of hardened alloy steel, has a 7 mm. journal and a plain disk web and is a good fit in the unbushed bearing. A 4 mm. cheese-head stud is used to secure the prop.

A mild fuel is suggested for the Sport-Glo by the makers and 2% nitromethane in a 3:1 methanol-castor mix is given as a formula. However, this is primarily on account of the high cost of nitro in Europe (around $4 a pint) and, for our bhp tests, we used a fuel containing 15 percent 2-nitropropane. Under these conditions we obtained a maximum of .113 bhp at 11,600 rpm.

The Sport-Glo has a nominal bore and stroke of 13 x 13 mm. giving a displacement of 1.726 c.c. or .105 cu. in. It weighs 2½ oz.

MAN at Work

(*Continued from page* 55)

much less fun competing among themselves."

Phil is going into radio.

• • •

► The Navy has been good to modelers in general (90% of their pilots were modelers) by sponsoring the Nats but, so far hasn't followed the lead of the other branches of the armed forces by providing modeling competition for its own men. Wanting to do something about it is a group of guys in Fleet All Weather Training Unit, Pacific Fleet. Ed Simpson AD1, Bob Blaikie, ADC, and Tom Henebry will answer all correspondence and listen to any idea that will smooth the way for a Navy team to give an account of itself at the '58 Nats. Any interested modeler in the Navy or Marines should write Henebry, T.H. AMC, MFA Division, FAWTUPAC, N.A.S., North Island, San Diego 35, Calif. Right now, it's all strictly unofficial.

• • •

► In Texas, the meets are the biggest, sure 'nuf. At the Southwestern Model Aviation Championships, they figure on 400 contestants, 158 trophies. The East Dallas Exchange Club sold the city of Dallas on a youngster's hobby park, modeling included. Took modeling out of the cotton patches. Forty acres, parking, and not near a residential area. Four ukie circles, even radio control and free flight. Some of these western and southwestern cities are downright friendly. Dallas won't be outdone by Los Angeles!

• • •

► March 28 through 31, the 11th Annual National Model Plane Show takes place in Higbee's 10th floor auditorium, Cleveland's Public Square, sponsored by the Air Foundation and the Cleveland Chamber of Commerce. Scads of trophies, famous guests of honor, a historic panorama of 2,000 models. Four types of competition models, with six classes of entrants based on school grade (and for those out of school, too). Takes 60 judges. One of the finest and oldest major modeling affairs. Dope from any local hobby shop, library, school, the Chamber of Commerce or Cleveland Press Aviation Dept. . . . No indoor meets? Big one—7th Annual Great Lakes Indoor Air Meet, Public Hall, E. 6th and Lakeside, Cleveland, Sunday, Jan. 5, 90-foot ceiling, acres of floor space. Dope from Cleveland Press Aviation Dept.

• • •

Bamberger Aero Club (Newark, N.J.) once the Nation's biggest, if not best, Emanuel Radoff. 61 Springbrook Rd., Livingston, N.J. plugging a reunion of old members. You there, Ben? . . . Vern Clements says plans of Sure Fun left off pushrod guide at Former 4—you'll lose up-elevator control at high speed. Pushrod bearings should be eyelets.

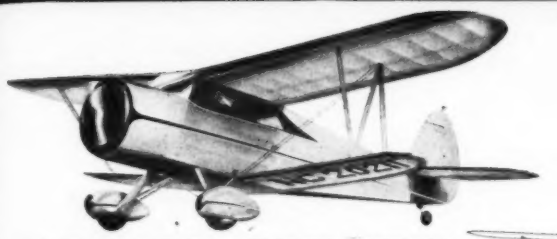
• • •

► Up, down, and now back stronger than ever, are the paint-by-number sets. What this has to do with FAI rules, we don't know, but the ramifications of this hobby business astound us. Reading Testors Topics—company so big they have a house organ!—see they have six of these paint kits. When Nils Testor does something, he does it big. Even installed equipment to mix their own oil paints. From the grapevine, hear these sets are a big hit, too. . . . Speaking of hits, Guillow hit the bull's eye with the balsa and paper WW 1 fliers. Told you so!

ANNOUNCING TWO NEW MODELS:

Berkeley's CHAMPIONSHIP "1/2 A" FLYING SCALE

1" = 1' Scale . . . For Free-Flight . . . Controline . . . or Rubber Power!
For .035 to .049 Engines Free-Flight . . . .049 to .099 Engines Controline (except as noted)



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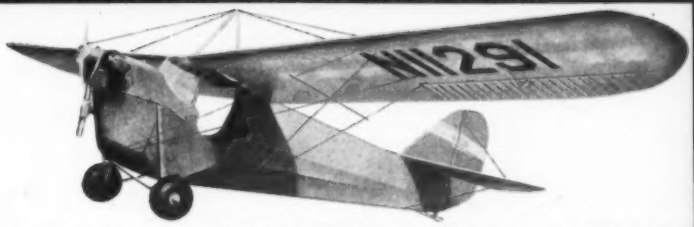
For ½A Free-Flight — Controline 1" Scale — 35" Wingspan

For "½A" Engines — .035 to .074

An unusual addition to our line of 1" Scale Championship designs. The "Waco" is easy to adjust and an unusually stable and high performance craft. As a Controline, its scale appearance and perfect proportions team up to make a fine flyer for everyday or Contest Flying Scale events.

Kit No: 4-13
$3.95
less wheelpant material



AERONCA "C-3"

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.020 to .051 Engines

This kit now joins other Berkeley 1" Flying Scale designs, a series which has won this event at the Nationals consecutively since 1938. Structurally simple, the "C-3" can be assembled and flown in a few days time. Flies well with high or low power free-flight or controline. Plans show both types.

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- Authentic Multi-color Decals
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- Metal Hardware and Covering Material
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Two seat observation plane used on a large scale in Korean War by the U.S. Army and the U.S. Marines. A large number of these are used by National Guard units. Powered by 213 h.p. Continental—130 m.p.h.

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Three place cabin monoplane originally introduced as the "Cruiser" in 1940 with 75 h.p. then as the "Super Cruiser" after World War II, with 104 h.p. and then in 1948 as the four place "Family Cruiser". "Super Cruiser" had a maximum speed of 115 m.p.h.

STINSON SENTINEL "L-5"

33½" Wingspan

Two place liaison and observation plane first flown in 1941. 1731 L-5's were built during World War II. Still in use by the U.S.A.F., Italian Air Force, and the Japanese Air Defense Force. Powered by 190 h.p. Lycoming. Maximum—129 m.p.h.—112 m.p.h. Cruising.

CESSNA "180"

35" Wingspan

Four place cabin monoplane introduced in 1953 using the same wing as the "170" but with a re-designed fuselage and tail unit. Powered by a 225 h.p. Continental Engine. Maximum speed is 165 m.p.h.

$2.95
Kit No. 4-7

FAIRCHILD 24 "RANCHER"

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First produced in 1933 as a two-seater, in 1938 was introduced as a four place model using either a radial Warner engine or an in-line Ranger. Military version was known as the YC-61 "Forwarder" by the U.S.A.F. and the "Argus" by the R.A.F. Production resumed for business use after the war. 132 m.p.h.

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Featured as a landplane, plans show pontoon details for those desiring the added thrill of water take-offs. Finished model is really spectacular.

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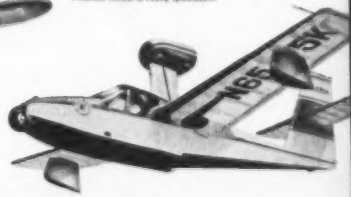
STINSON VOYAGER "150"

.34" Wingspan

Originally built by Stinson division of Consolidated Vultee. Added to the Piper line in 1948. Four place 165 h.p. Franklin engine. 145 m.p.h. maximum speed.



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(Not for Rubber Power) 33½" Wingspan

The hull design is perfect for realistic water take-offs.

Three place amphibian with retractable landing gear. Navy visual prototype when converted to serve as a bomber. Powered by 125 h.p. Lycoming. 125 m.p.h.

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1¼" Scale — 37½" Wingspan

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The "Buhl Pups" have been immortalized as one of the finest light planes ever designed. A number of full scale "Buhl Pups" are being rebuilt by "old timers". This truly different design makes an exceptionally realistic and fine flying model.

Each year from all over North America, the top Scale Model Builders come to the Nationals to fly in the exacting Flying Scale Event where models are judged for workmanship, authenticity and most of all — flying performance! Against this keenest of competition Berkeley's Flying Scale designs have won 1st or 2nd in this event

at every Nationals' for the last 18 years!!

We are proud of this extraordinary record

Berkeley's RADIO CONTROLLED FLYING SCALE Designs

RADIO-CONTROL ... FREE-FLIGHT ... CONTROLINE

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"AIRCOUPE"
For Radio Control— Free-Flight— Controline
Kit No: 3-7 **1½" Scale .074 to .29 Engines**
$5.95

As much fun as it is to fly-it may be built as a free-flight, radio or controline design. Stable and easily adjusted as a free-flight, rugged and fun to fly. As a radio design-ideal for rudder and motor control, with the data on plans. A truly practical scale design for rough and ready controline flying.

CESSNA "170"
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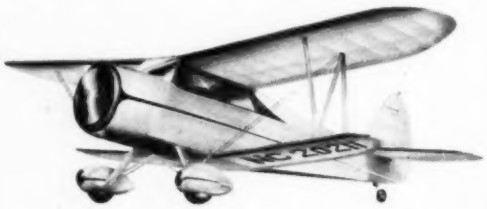
.25 to .35 Engines — 72" Span — 2" Scale

Controlling your "Cessna 170" by Radio is a thrill you will not forget! Perfect in scale, rugged, stable in all attitudes, yet responsive in control, with good wind penetration qualities. The gear location is ideal for extended take-off runs. The larger than average size makes it easier to control in windy weather.

"KING SIZE FLYING SCALE"
"WACO CABIN"
For Radio Control—Free-Flight—Controline
1½" Scale —52" Wingspan
For .14 to .29 Engines Kit No: 3-6 **$9.95**



The 1½" scale "Waco" spans 52". Weight with all radio equipment installed is 4½ lbs. 630 sq. inches wing area. Model is designed for multiple control through compound escapement systems. In flight it is very stable and easily controlled with rudder only type installations. Rudder, elevators, motor and steerable tailwheel may be actuated. Radio equipment is removable as a unit for convenience.

1" = 1' Scale—48" Wingspan
.035 to .15 Engines

De Havilland
"BEAVER"
$4.95
• Formed Metal Ring Cowl

This high aspect-ratio Canadian Bush Flying type aircraft now is in use by the U.S. Air Force. As a scale design, it is well proportioned and capable of contest performance. In R.C. and Controline flying, its long moment arm make it ideal for spot landings with motor control, Metal Cowl, Full Size Plans, etc.

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BIG 1½" SCALE
54" WINGSPAN FOR .09 to .19 ENGINES

• **Adjustable Ailerons** for manually setting trim
• **Laminated Structure** stronger, lighter, easier
$7.95
• **Operating Wing Flaps** radio or controline actuated

Here is the latest scale "Cessna" that is a "natural" for radio control. The big proto ship takes-off and lands with "hands-off" control. The model handles just as easy! It's a model builders dream ship!

The kit is very complete in true Berkeley tradition with prefabricated wood parts, silkspan, landing gear and hardware, plus the super-detailed plans and full-colored authentic decals found only in Berkeley Kits.

Army Liaison YL-24
"HELIOPLANE"
$3.95
Variable Camber Wing for Two-Speed Radio Control Flying
For .049 to .14 Engines — 39" Wingspan — 1" Scale

"Helioplane" is first model that permits use of scale flaps. Depress 10 degrees for free flight; 25 degrees for slow speed control by radio; or raise 5 degrees for high speed.

"KING SIZE FLYING SCALE"
1½" Scale — 54" Wingspan
AERONCA "C-3"
For Radio Control — Free-Flight — Controline
.099 Engines R.C. — .074 Free-Flight — .15 Engines Controline
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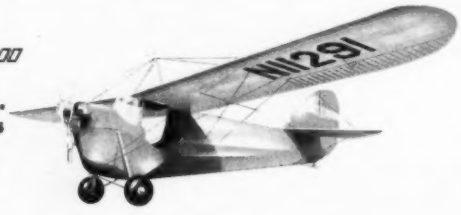
Designed for rudder control with optional elevator and motor control. Ailerons can be set for trim. All equipment easily accessable through the cabin. Controline version is fun to fly with motor control.



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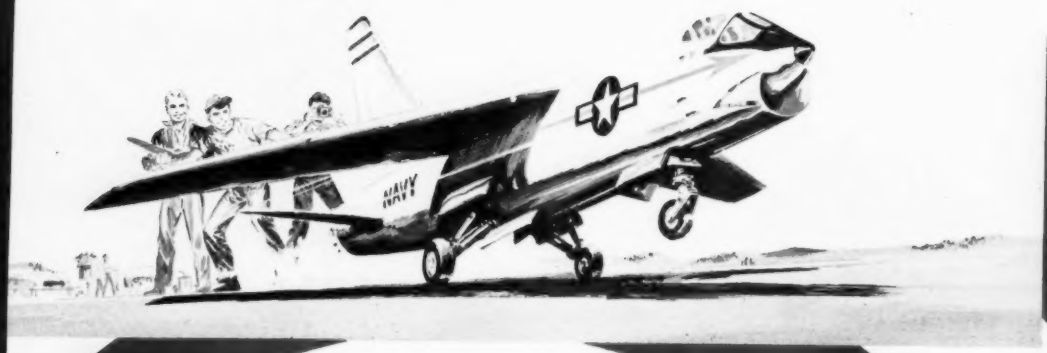

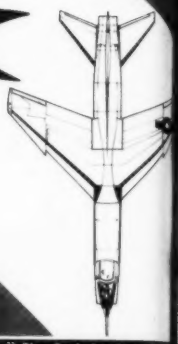

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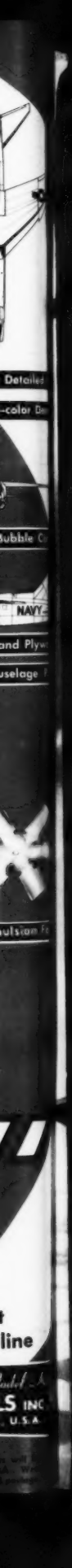
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